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SIXTY YEARS OF FRONTIER WARFARE.

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Friday, January 19th, 1900.

Colonel Sir THOMAS H. HOLDICH, K.C.I.E., C.B., R.E.,
in the Chair.

THE reason I wrote this paper was that in 1897 it struck me that, from the tone of the Press, and from things that were written in the Press, there was a prevalent idea that the Pathans had adopted new tactics. My study of frontier warfare had made me take an opposite view; but, in order to be quite sure, I began to study it further; and the result of my study has been that it has appeared to me that the tactics of the Pathans in the first Afghan war, which commenced in 1838, were precisely the same as the tactics of the Afridis in 1897. In order to demonstrate that, I therefore wrote this paper, which I have called "Sixty Years of Frontier Warfare."

Major-General Sir W. F. Gatacre concluded a recent lecture before the R.U.S.I. with the following remark:—"Above all, we require that officers should by careful teaching extract greater attention and more intelligence from men in their drills and manœuvres. This can only be done by increased study, on the part of the officers, of our previous experiences in frontier wars, and by their imparting the result of their studies in the simplest and most realistic way to their men." Now, in order that officers may do what General Gatacre recommends, we really want a thoroughly good official manual on mountain and savage warfare. At present such a manual does not exist, although the last two years have produced an extensive literature on frontier warfare in the shape of books,

pamphlets, lectures, and essays, of which some three or four were named, in a recent Indian Army Order on Instruction in Hill Warfare, as useful guides to the study of that subject. The writers of these, with one or two exceptions, take no notice of the earlier records of frontier warfare. For the proper study of those, six years, and not six months, would be needed. Brigadier-General Egerton prefaces his little book with the remark that the notes contained in it are almost all to be found in the Standing Orders of the Punjab Frontier Force. As the history of frontier fighting is the history of the Punjab Frontier Force during the last half-century, this is what might be expected. Major Rodwell, in his "Bangalore Lectures" of 1898, gives a clear account, with good illustrations, of the night attacks at Palosi (1860), Wano (1894), and Nawagai (1897), and of other incidents. Major G. F. Younghusband limits himself in his "Indian Frontier Warfare" to a retrospect of twenty years, *i.e.*, to the outbreak of the second Afghan war in 1878. Now the history of North-West Frontier warfare goes back sixty-one years, and I propose to show you that the tactics of the tribesmen were the same in the first Afghan war (1838-42) as in 1897, and that our soldiers in the year 1842 understood those tactics as well as we do now. As an instance, let me read to you what Major George Broadfoot, an officer who was one of the mainstays of the defence of Jalalabad in 1842, says of Pathan tactics:—"The Afghans are masters in mountain warfare, individually brave, yet cautious and watchful; skilful in choosing ground, and of a coolness never to be disconcerted; swift to advance, timely in retreat, and expert in both; their masses were but seldom shown, hardly ever uncovered to our fire, yet never far away when a blow could be struck. This will apply to all Afghans." The Afghans of Broadfoot's day are the Afghans of to-day. One thing only is new, and that is, that the tribesmen are now to some extent armed with quick-firing and long-range rifles. The old jezail, as I will show you presently, was no despicable weapon; but a rifle with a range of two thousand yards or more has placed a power in the hands of these mountaineers of which they knew nothing till very recently. Major G. F. Younghusband certainly foresaw the importance of this change, and foretells that "improved armament would alter the problem that British commanders would have to solve." He wrote, however, prior to the experiences of 1897.

Captain James, the well-known Army "coach" and editor of the "Wolsey Series," who writes the preface to Major Younghusband's book, lays down the axiom that the soldier trained to meet disciplined foes is thereby better able to meet undisciplined ones. Now this, I think, is true only in so far as discipline and steadiness in the ranks are invaluable factors in all the exigencies of war. One hundred and fifty years ago the Red Indians and French Canadians taught British regiments—who, as history shows, could face any Continental foe—some bitter lessons. Our earliest "savage warfare" was with the Indians and French Colonists of North America. In 1755, near Fort Duquesne, on the Alleghany, two British regiments of the Line, some one thousand three hundred strong, under General Braddock, were almost annihilated by two hundred and

fifty French Canadians and six hundred and fifty American Indians. The Virginian Irregulars, under George Washington, alone on that occasion held their own, and saved a portion of the force. Brigadier-General Forbes, who three years later succeeded where General Braddock had failed, and forced the French to evacuate Fort Duquesne, has left his opinion about this sort of fighting recorded in these words (written to a friend):—"I have long been of your opinion of equipping numbers of our men like the savages, and I fancy Colonel Burd of Virginia has most of his best people equipped in that manner. In this country we must learn the art of war from enemy Indians, or anybody else who has seen it carried on here." An officer of Montcalm's army, at the defence of Quebec in 1759, the Chevalier Johnstone, sums the case up thus:—"A Canadian in the woods is worth three disciplined soldiers, as a soldier in the plain is worth three Canadians." Apply this to frontier warfare: a disciplined soldier in the plain is worth three or more Pathans, but a Pathan on his own mountains is a match for several soldiers who have not been trained to hill warfare.

The Zulus, the Soudan Arabs, and the North-West Frontier Pathans have each taught us that in addition to discipline and Drill-Book formations, our troops must adopt special tactics to meet them. Our Indian troops learnt what was probably their earliest (which is proverbially costly) experience of hill warfare from the Gurkhas in 1814-16. The historian of the Nepalese War, Mr. H. T. Prinsep, states:—"Little progress was made until we had learnt a lesson from the Gurkhas." We are at this moment learning how to fight a nation of mounted infantry.

I have found it a very interesting study to compare the features and events of the frontier fighting of 1897 with that of earlier years, and I should like to-day to tell you what I think that study has to teach.

To my thinking the lessons to be learnt from the fifty-eight years' fighting between 1839 and 1897 are just as valuable as those taught in 1897 itself; and those lessons our old frontier commanders, such as Sir Neville Chamberlain, knew by heart. If those lessons had long ago been embodied in an official manual and made part of the military curriculum or programme of instruction for all ranks of the Army, some of the mishaps which occurred in 1897 would perhaps have been avoided. Losses, of course, must occur. Yet our losses in Tirah were proportionately less heavy than those in the Mahsud Waziri expedition of 1861 and the Ambela campaign of 1863-4. In *Blackwood's Magazine* for February, 1899, there is a strong remonstrance (based on a comparison between the losses at Salamanca and those in Tirah and at Omdurman) by General Sir H. Brackenbury against the prevalent tendency to howl and carp at the slightest loss by, or reverse to, our troops. He quotes the case specially instanced also by Sir Herbert Maxwell in his recently published "Life of Wellington," viz., that of the 61st Regiment, which lost at Salamanca 24 out of 27 officers and 342 out of 420 soldiers, killed and wounded. Sir Herbert adds:—"It is worth reflecting whether our

nerves to-day are strong enough to endure an announcement to similar effect in the morning papers." It is, also, to my mind, worth considering how far this tendency to raise an outcry over our losses has been developed by the sensational reports and pictures of our modern war correspondents and war artists, and—I may even add—by the tone of some of the despatches. When the Marines at Gras Pan on 27th November lost about 45 per cent. in killed and wounded, the correspondent of a London daily wired that such loss was, he believed, "unprecedented." The 61st at Salamanca lost about 82 per cent. At Assaye there were 2,050 casualties in a force of 4,500. Of Albuera, Napier has written:—"1,500 unwounded men, the remnant of 6,000 unconquerable British soldiers, stood triumphant on the fatal hill." The 57th Foot alone lost 23 officers and more than 400 men out of a total of 570. It is of this battle that the Duke of Wellington wrote:—"If it had not been for me, they would have written a whining report on it, which would have driven the people of England mad. However, I prevented it." At the battle of St. Privat, in less than half an hour, the Prussian Guards lost 4,500 out of 12,000 men. If our war correspondents aim at guiding the judgment of the nation on military events, they must themselves first acquire a competent knowledge of military history.¹

I propose first to say a little of the performances of the troops whom we employed against the Pathans sixty years ago. At that time we had not conquered the Punjab and Sindh. The Sikh, Pathan, Baluch, and Punjabi had no place in the ranks of our Native Army, and although there had been since 1815 three Gurkha battalions in our Service, they were not employed against the Pathans till 1850. The Sikhs, who were our nominal allies in 1838-42, were not to be relied on. Regiments of Afghan infantry and cavalry were formed in Shah Shuja's service, but in the hour of need and of battle they held back or deserted *en masse*. Some Punjabi Muhammadans there were in Shah Shuja's Contingent. They, in

¹ One point that must specially strike the student of military history is the reticence of officers in the early part of this century, as contrasted with the numerous letters from officers and soldiers which now appear every day in the Press. Simmons, of the 95th Rifles, and Brackenbury, of the 61st Foot, during the Peninsular War, specially cautioned their relatives not to let their private letters become public property. To-day the papers are flooded with criticisms on the war from every source, even from ladies. The *Times* printed one from a well-known Anglo-Indian lady novelist; the *Standard* another from a prominent actress. This evil will probably correct itself. Not long ago the *Daily Mail* notified that it would *not* publish letters criticising the conduct of the war. It mentioned that they were coming in by "thousands." The Queen's Regulations for the Army (para. 423) contain the following clear admonition:—"Officers and soldiers. . . will be held responsible for all statements contained in communications to their friends which may subsequently be published in the Press." From what has occurred in the present South African war, it would appear desirable that, on the occasion of future wars, this order should be read out to all troops concerned, and a copy of it communicated to the Press in general. Neither officers, soldiers, nor editors appear to be acquainted with it; and the relatives of officers and soldiers cannot, as a rule, be expected to be acquainted with it.

one case at least, went over to the enemy, and attacked their own British officers. The Gurkhas of Shah Shuja's Contingent were staunch and did good work. All this is said without prejudice to the splendid service which these races have since rendered. I merely state what was the case during the first Afghan war.

Our warfare with the trans-frontier races may be divided into five periods:—

1. The first Afghan war of 1838-42. (This was followed by Sir Charles Napier's conquest of Sindh, and the two Sikh wars of 1845-46 and 1848-49, at the end of which our frontier marched with that of the Pathan and the Baluch.)
2. 1850-78.—About forty frontier expeditions.
3. 1878-81.—Second Afghan war.
4. 1881-96.—A number of frontier expeditions.
5. 1897.—The great rising on the North-Western Frontier.

Ten regiments of Her Majesty's Army and one Bengal European regiment served in the first Afghan war. Then, as now, the British troops were the backbone of any force sent on active service by the Government of India. A notable instance of this was the assault on Ghazni in 1839. Sir John Keane had left his siege artillery at Kandahar. After a reconnaissance it was decided to blow in the Kabul Gate (a duty that devolved on the Royal Engineer officers, Captains Thomson and Peat and Lieutenants Durand and McLeod) and carry the place by assault. It was a rehearsal of the blowing in of the Kashmir Gate at Delhi, acted before dawn instead of by daylight. The four British regiments there, 2nd, 13th, and 17th Foot, and the Bengal European regiment, led by Brigadier Sale ("Fighting Bob Sale," as he was known in the Army), Colonel Dennie, and others, formed the storming party. The gate was blown in at three a.m., and by five a.m. the colours of the 13th and 17th Foot were planted on the citadel of Ghazni.

The 2nd and 13th Foot¹ took part both in the first Afghan war, and in the frontier fighting of 1897. The 13th went up with Keane at the end of 1838, and after four years' service in Afghanistan, during which they bore the brunt of the fighting, returned to India with General Pollock in October, 1842. They were one of the leading regiments at the storming of Ghazni in July, 1839; they took part in the operations in the Kohistan under Sale in the autumn of 1840; they fought their way from Kabul to Jalalabad in October, 1841, and helped to defend that place against Muhammad Akbar Khan and many thousands of Afghans till 7th April, 1842, when a bold sortie of the garrison, in which their brave Colonel Dennie was killed, inflicted defeat on the besiegers and raised the siege. Subsequently the 13th, as part of Sale's brigade, shared in all the operations and fighting under General Pollock, and after avenging the massacre of the previous January, returned to India in October, 1842.

¹ Now the Queen's West Surrey Regiment and the Somersetshire Light Infantry.

I think that of all the fighting in the four years of the first Afghan war, that of Sale's brigade on its march from Kabul to Jalalabad bears the closest resemblance to that which our troops encountered in Tirah. The Rev. G. R. Gleig, who himself served as a subaltern in the Peninsular and American Wars (1813-14) and afterwards, taking Holy Orders, became Chaplain-General of the Forces, has left a very graphic account of this march of Sale's brigade. Time, place, troops, and tribesmen being changed, it might almost be the history of Sir William Lockhart's retirement down the Bara Valley. Sale's relentless foes were Ghilzais, not Afridis, and they had jezails, not long-range breech-loaders. The jezail, however, had, by the consensus of all writers on the first Afghan war, a range at least double that of the old Brown Bess. If you will read Gleig's account, you will find the same precautions taken to piquet and protect the camp, and to piquet the heights on the line of march, the same arrangements made to enable the rear guard to hold its own against the stern pursuit of the tribesmen, and to safeguard the baggage—always the two most vulnerable points. We find the cavalry told off to guard the flanks of the baggage, because the mere dread of that arm made the Pathan very cautious of exposing himself in the open. We even find on one occasion some companies of the 13th Light Infantry, overtaken by the dark, ensconcing themselves in a fortified house, as Colonel Haughton did at Tseri Kandao and Major Downman at Sher Khel, and holding it until Sale's rear guard was safe into camp. They then (at 11 p.m.) withdrew. These are some of the most striking resemblances. You will find many more if you will yourselves read Gleig's account.¹ I should be glad if my study of the first Afghan war enabled me to say that our troops on rear guard had always been able to hold their own. Evidence is often contradictory, but there is no doubt that on one or two occasions the intricacy of the country and the swarming activity of the tribesmen proved too much for our rear guards. The columns of Generals Pollock, McCaskill, and Nott, in October, 1842, had some stiff rear-guard fighting during their retirement from Kabul to Peshawar. When any serious mishap did occur, it was due to the baggage and rear guard being caught in the dark. On one occasion the troops of Nott's division left their dinners (it was 8 p.m. and pitch-dark) to go out and bring in the rear guard, which was sore beset. They did so most successfully, and prided themselves on not having lost a single wounded man or a transport animal. It is true that it is in civilised warfare the duty of a rear guard to expose, and even, if need be, to sacrifice itself, in order to save and give rest to the main body; but in frontier warfare I would reverse this rule, and make it incumbent on the main body to be, if necessary, the rear guard. This is what was done by the 4th Brigade, Tirah Field Force, under Brigadier-General Westmacott, on 13th December, 1897. The biographers of Sir Harry Lumsden, the first commander of the Guides, have placed on record this reminiscence of Sir Colin Campbell (Lord Clyde), who from 1849-52 commanded the Peshawar district:—"In all retirements he stuck doggedly to his rear guard until he saw the last of his column safely out

¹ "Sale's Brigade in Afghanistan," by the Rev. G. R. Gleig, pp. 80 and 92-93

of danger." This is a motto not to be forgotten. The Tirah Expedition furnished striking illustrations of the virtue of "sticking doggedly to the rear guard." That virtue shone conspicuously in the late Lieut.-Colonel John Haughton and in his brigadier, Sir Richard Westmacott. Colonel Haughton in one of his private letters says:—"We [the 36th Sikhs] are now known as 'the Royal Rear-Guards.'" It is a title to be proud of.

At the time of the first Afghan war, the Bengal troops in general, horse, foot, and artillery, were recruited mainly from Oudh and the North-West Provinces; while the Bombay Army was, to the best of my belief, mainly recruited in its own Presidency.¹ There was a strong rivalry between the two Armies. In the journal which Captain Augustus Abbott (a Bengal artillery officer and one of the staunchest defenders of Jalalabad), kept during this war, we find the turn-out and workmanlike capacity of the Bombay artillery (page 96) and cavalry (page 81) spoken of with critical appreciation. Both Armies had reason to be proud of their past services. The Bengal sepoy could quote Cuddalore, Java, and Isle de France, where his predecessors had stood firm against French troops; and refer to Bhartpur, where the old 12th Native Infantry had, despite ultimate repulse, three times planted its colours on the crest of the breach. The Bombay sepoy could speak with pride of Koregam, Assaye and Kirkee, Mysore and Seringapatam.

The native troops of both Presidencies worthily maintained these traditions in the first Afghan war. The Bengal Army was employed mainly at Quetta, Kelat, Kandahar, Kabul, Jalalabad, and Peshawar, and on the lines of communication between these places. When the garrison of Kabul (about five thousand men) were annihilated in January, 1842, all the garrisons and posts in Afghanistan had to hold out as best they could, till the Government of India, after lamentable vacillation, allowed Generals Pollock and Nott to move to their aid. With the Bengal troops rests the honour of:—1. The defence of Kelat-i-Ghilzai by two hundred and fifty men of the old 43rd Bengal Infantry (now the 12th Bengal Infantry, and still known as the Kelat-i-Ghilzai Regiment), from November, 1841, to the end of May, 1842, when the final assault of the Afghans was successfully repulsed. When Captain Craigie, who commanded the garrison, took over Kelat-i-Ghilzai, it was in a most indefensible state. Craigie and his men made it defensible, and held it for more than six

¹ There were many Rajputs in both. There was a marked difference of system and discipline between them, as a perusal of Brigadier-General John Jacob's "Views and Opinions" (written a few years before the Mutiny) will show. [His condemnation of the Bengal system was most severe. Though the Bengal sepoy continued to do good service, at any rate to the close of the Sikh wars, the canker that was eating at the core of the Bengal Army had been at work for years. In May, 1842, Major Eldred Pottinger, when a prisoner at Kabul, writing to Mr. Haughton (the grandfather of Lieut.-Colonel John Haughton, or the 36th Sikhs), predicts that Lord William Bentinck's "popularity" policy will ruin the Native Army and cause a mutiny. Sir William Sleeman foresaw mutiny if Oude was annexed. Sir John Kaye makes it clear that Army Headquarter interference with the prestige and powers of commanding officers of regiments predisposed the sepoy to mutiny and sapped the influence of the British officers over the native ranks.]

months, repulsing a vigorous assault just before they were relieved in June, 1842, by a column sent out from Kandahar by General Nott. 2. The defence of Ghazni by the 27th Bengal Native Infantry, from the beginning of November, 1841, to the 6th March, 1842, when owing to want of water, provisions, and ammunition, the paralyzing effect of the intense cold (14° below zero) on the Indian natives, and the untenability of the place, Colonel Palmer decided to obey the instructions sent him long before from Kabul, and accept the terms of surrender offered him by the Afghans. These terms they foully broke. They treated their prisoners with the greatest cruelty, even torturing Colonel Palmer.¹

The old 31st Bengal Infantry (now the 2nd Rajputs) did good work at the storming of Kelat in November, 1839. The fight was stubborn, one hundred and thirty-nine out of one thousand and forty-nine stormers were killed and wounded. The 35th Native Infantry fought splendidly under Sale in the march from Kabul to, and in the defence of, Jalalabad. The 37th Native Infantry fought its way from Kabr-i-Jabar to Kabul early in November, 1841. Sir Vincent Eyre says of this retreat:—"While striking his camp Major Griffiths was attacked by the mountaineers, who now began to assemble on the neighbouring heights in great numbers; and his march through the Pass from Butkhak to Kabul was one continued conflict, nothing saving him from heavy loss, but the steadiness and gallantry of his troops, and the excellence of his own dispositions." This regiment was massacred in the retreat from Kabul in January, 1842.

When the news of the destruction of General Elphinstone's army, and of the beleaguerment of Sale's brigade in Jalalabad reached the Government of India, Brigadier Wild was directed with four raw Bengal infantry regiments to endeavour to relieve Sale at Jalalabad. His troops, though they failed to carry out the task allotted to them, held their own against the Afridis of the Khyber in a way that deserves some recognition. Two battalions, under Colonel Moseley, by a sudden march at night, seized Ali Masjid, but a few days later, when the place, owing to want of supplies, became untenable, had to fight their way back to Jamrud. The losses on the second occasion were heavy. Would two or three regiments nowadays, without guns, be sent to fight their way to Ali Masjid and back again? Two or three brigades were sent there in the winter of 1897-98. General Nott had the firmest faith in the Bengal sepoy. As both George Broadfoot and John Nicholson state that "Nott defeated the Afghans wherever he met them," he (Nott) had undeniably the best of grounds for his faith. He was the last man to praise any but a good soldier. He writes thus to a friend:—"Our sepoys are noble fellows; one thousand are fully equal to five thousand Afghans or more. . . . I am quite sure,

¹ Among these prisoners was one whose name stands very high on the roll of those who have given themselves for their Queen and country in India. John Nicholson was then a subaltern in the 27th Bengal Native Infantry. He survived this siege and the terrible seven months' imprisonment that followed it, to become in 1857 the hero of the siege and fall of Delhi. The place where he was struck down near the Burn Bastion, between the Kabul and Lahore Gates, is now marked by a tablet to his memory. His grave is in the cemetery not far from the Kashmir Gate.

and should like to try it to-morrow, that five thousand Bengal sepoy would lick twenty-five thousand Afghans."

The great value and moral effect of cavalry in warfare with Pathans have been proved. On the 29th October, 1841, at Dadur, one hundred and twenty-one sabres of Skinner's Horse (Hindustani Muhammadans), now the 1st and 3rd Bengal Cavalry, held in check for a time with dismounted fire, and afterwards charged and scattered from three to four thousand Baluchis under Mir Nasir Khan. It was a fine exploit; twenty-six men and twenty-eight horses (more than one-fifth of the detachment engaged), were killed and wounded. The British officer in command was incapacitated by a wound early in the engagement. The native officers then took command, and one of them rode down the line before the charge, and reminded the men that they had to maintain the honour of the Bengal Army in the sight of the Bombay troops. (Detachments of the 5th and 25th Bombay Native Infantry also garrisoned Dadur at the time, and took part in the engagement.) It was with men such as these (the Sindh Irregular Horse) that Major John Jacob, in 1846-48, completely pacified the Baluch border, where for some years (1840-45) a whole brigade of Regular troops had proved powerless to curb the raids of Bugtis, Marris, Jekranis, and other Baluch mauraunders. I can only briefly mention other cases in which cavalry played havoc with large bodies of Pathan guerillas. In March, 1860, Resaldar Saadat Khan, of the 5th Punjab Cavalry, with one hundred and sixty sabres, first drew on into the open, and then charged and routed several thousand Waziris. In January, 1864, a squadron of the 7th Hussars charged a body of 5,000 Momands at Shabkadr three times, and broke them up. On the same ground Major Atkinson, with two squadrons of the 13th Bengal Lancers, overthrew several thousand Momands in August, 1897. At Khar, in 1895, Captain Adam, with fifty sowars of the Guides, charged, routed, and pursued two thousand Pathans who were expecting to take our infantry by surprise. The surprisers were surprised. Early in 1879, the 3rd Sindh Horse charged and inflicted heavy loss (one hundred and sixty-three left on the field) on some thousands of Alizais who harried General Biddulph's rear guard as he retired from the Helmand towards Kandahar. On 13th July, 1880, the 3rd Bombay Cavalry and 3rd Sindh Horse pursued beyond the Helmand some two to three thousand of the Wali of Kandahar's troops, who were deserting to Ayub Khan, dispersed them, and recovered a battery of guns which they were carrying off. The battle of Khushab in 1856 was a victory for the Bombay Cavalry and Artillery over a Persian force of all arms.

On several occasions in 1897 the Guides Cavalry and the 11th and the 13th Bengal Lancers charged, over rough ground, and broke up large bodies of Pathan footmen. Of the charge of the Guides, led by Captain Palmer, in which Lieutenants Greaves and MacLean lost their lives, Captain Palmer was severely wounded, and Lieut.-Colonel Adams and Lord Fincastle won the V.C., we may say what General Bosquet said of the Balaclava charge—" *C'est magnifique, mais ce n'est pas la guerre.*" As in protecting long columns of baggage, so in covering retreats, cavalry have often been invaluable in frontier warfare. The moral effect of its presence

prevents the tribesmen from venturing into the open, and coming to close quarters. In these days, however, when they have long-range rifles, they can do very serious damage without quitting their hill-tops, and cavalry in consequence gets less chance of acting against them with effect.

The Bombay troops served during the first Afghan war mainly on the line of communications in Upper Sindh. Their task was an arduous one: for not only had they to keep in check the marauding Baluch tribes, but they were greatly tried by the intense heat. As soon as the army under Sir John Keane began, in the winter of 1838-39, to cross the "Pat" and ascend the Bolan, the Baluch tribes commenced to harry both troops and convoys, and continued to do so throughout the campaign. At the beginning of the cold weather of 1839-40 it was decided to attack them in their own mountain fastnesses. Major Billamore, with a force of about seven hundred men (four hundred infantry, two hundred Sindh Irregular Horse under Lieutenant Clarke, and two or three guns under Lieutenant Jacob), scoured the Bugti and Marri country, making the roads passable for guns as he went, defeated the Bugtis twice, occupied Bugti-Dera and Kahun, their chief towns, and having taught them a severe lesson returned to the plains. It was then decided to occupy Kahun, hoping that the presence of our troops there would act as a check on the raiders. In May, 1842, in intense heat, Captain Lewis Brown, with two hundred and fifty rifles of the 5th Bombay Infantry, eighty sabres under Lieutenant Clarke, and one gun, marched from Pulaji *via* the Surtoff and Nefoosk Passes—a most difficult route for troops and transport—and after some fighting occupied Kahun. He then sent Clarke back with his eighty sabres and one hundred and ten rifles to bring up a convoy of supplies. The whole fighting strength of the Marris had now assembled. They fell on Clarke's detachment between the two passes, and despite a very brave resistance, simply annihilated them. Clarke was a very fine officer, a worthy prototype of the distinguished soldiers (Generals John Jacob, Sir W. Merewether, Sir George Malcolm, Sir Henry Green, etc.) who afterwards commanded the Sindh Irregular Horse. Captain Brown continued to hold Kahun, awaiting relief. In August, Major Clibborn, with a mixed force about six hundred and fifty strong (four hundred and sixty-four bayonets 1st and 2nd Bombay Grenadiers, two hundred sabres Sindh Irregular Horse, under Lieutenants Lock and Malcolm, and three guns)—endeavoured to force the passes. He was encumbered with a large convoy. The Marris, some thousands in number, attacked him. After fighting all day he drove them back, inflicting heavy loss. His own force also suffered severely. He remained indeed master of the field, but water—in such heat the very staff of life—was not to be found. His men were utterly exhausted and frantic with thirst. Finally at midnight he decided to retreat, abandoning his stores and guns.¹ The task that was

¹ These guns were recovered in 1859 by Lieut.-Colonel (now General Sir Henry) Green, who succeeded Brigadier-General John Jacob in the command of the Sindh Frontier. He led an expedition in that year to Kahun, and brought the Marris to bay at the Pass of Keamari. Thus cornered, they surrendered.—*Vide* "The Defence of Kahun," by C. R. Williams, pp. 106-8.

assigned him, considering the heat, the country, the want of water, and the weakness of his force, was seemingly almost more than human nature could carry through. The Government after enquiry recorded its opinion that he and his troops had done their best, and had failed from causes beyond human control. In September, Captain Brown made terms with the Marris, who were thankful to evict at any price so tenacious a tenant, and marched out with all the honours of war. With unflinching perseverance he conveyed every man of his detachment (forty men were sick of fever and scurvy and had to be carried) and his one gun, dragged by hand over those difficult passes, safe to our outposts at Pulaji. The Marris honourably kept their promise not to molest him. Contrast this with Muhammad Akbar Khan's massacre of General Elphinstone's troops, and the treatment of the Ghazni prisoners in 1842, and (in recent times) the massacre of the 14th Sikh prisoners at Koragh. The word "Kahun" is now borne on the 5th Bombay Infantry colours. The Governor of Bombay issued a special order commending the gallantry with which Captain Brown and his detachment had held out at Kahun, and directed that that order should be read out on parade to every regiment in the Bombay Army. Only those who know Upper Sindh, and the mountainous tract bordering it on the north, can realise its intense heat and the difficulties that attend operations in such a country. In 1845, Sir Charles Napier took 3,000 men and twenty-three guns to attack the Bugtis. When Sir Charles McGregor was sent in the autumn of 1880 to punish the Marris, he took a strong brigade with him. Similarly Sir Oriel Tanner, in 1884, when Zhob was subdued, and Sir George White in 1890, when the Shiranis were brought under control, were each accompanied by at least the equivalent of a brigade. In 1839-40 a few hundred men were sent to do what we now attempt only with thousands. The storming of the town and fort of Sibi early in 1841 is another case of trying to do things with inadequate forces. The troops (Bombay cavalry and infantry, and a troop of European artillery) after three and a half hours' desperate fighting had to withdraw. Anyone who has seen the massive walls of Sibi will understand how futile it was to expect to make any impression on them with field guns. The defenders, however, decided not to await a second attack, and evacuated the place during the following night. The detachments of Bombay troops, stationed at Dadur, Lehri, in Kach Gandawa and in the Bolan Pass, had their work cut out for them in 1840-41, in defending their posts and in coping with the thousands of Baluchis, who, under the command of Mir Nasir Khan, infested the country. Suffice it to say that the historians of the first Afghan war speak of the determined and persevering gallantry and the steadiness of the Bombay troops, and General Brookes, who commanded them, has left on record in his Field Army Orders his appreciation of their services. These same troops afterwards fought under Sir Charles Napier at Miani and Dabba, and conquered Sindh. That distinguished general's published orders contain repeated references to the good work done by these troops. Recently, at Simla, Colonel Sinclair, R.E., in his lecture on the second Sikh war, drew attention to "the bravery and loyalty of our Native Army, whether from Bengal or Bombay, in sharing, shoulder

to shoulder, the dangers, the hardships, and the losses of their British comrades, in which they were in no case behindhand." This is the evidence of a writer who can have no bias.¹

In the Nepalese war of 1814-16 we first learnt, somewhat to our cost, what the Gurkhas could do in the way of mountain warfare.² Since then their fine qualities as soldiers and mountaineers have been used for, and not against, us. The three original Gurkha battalions (called the Sirmoor, Nasiri, and Kumaon battalions) fought under Lord Combermere at Bhartpur in 1826.³

In 1838 a battalion of Gurkhas was raised as part of Shah Shuja's Contingent, and was known as Shah Shuja's 4th Regiment of Gurkhas. Four British officers and two British non-commissioned officers served with it. It marched up with Sir John Keane, saw some fighting on the way up and at Ghazni, served from the autumn of 1839 to the autumn of 1840 in the Hindu Kush passes beyond Bamian and took part there in several severe engagements, in which it acquitted itself well. After assisting Colonel Dennie in breaking up the force led by the ex-Ameer Dost Muhammad Khan himself, it returned to Kabul for the winter of 1840-41. In April or May, 1841, it was sent to garrison Charikar (40 miles due north of Kabul), a place which commanded both the roads over the Hindu Kush, and those to Bamian, Kabul, and Jalalabad—a most important strategical point. The Gurkhas found the place, like Kelat-i-Ghilzai, most imperfectly defended, and its defences were by no means completed even at the end of October, 1841, when the insurrection at and all round Kabul woke them to a realisation of the dangers of their position. Worst of all, their water-supply could be, and was promptly, cut off. Major Eldred Pottinger, the hero of the defence of Herat in 1837-38 against the Persians, was Political Agent at Charikar. Captain Codrington was commandant, and Lieutenant John Colpoys Haughton, the father of Lieut.-Colonel John Haughton of the 36th Sikhs, was adjutant of the corps. Two ensigns, Salusbury and Rose, and a doctor, completed

¹ I have mentioned in a previous note some of the causes which led to the Mutiny and the breakdown of the old Bengal and Bombay Armies. I believe that the acquisition of the Punjab greatly contributed to the same end. When the Government of India obtained the services of the Sikh, Pathan, and Punjabi, the market value of the old sepoy and sowar declined. From the close of the Mutiny to the second Afghan war the Bengal (proper), Madras, and Bombay Native troops received little attention. The work of reform began under Sir Donald Stewart and was completed under Lord Roberts. The campaigns or expeditions of Egypt, Burma, Suakin, Zhob, Lushai, Tirah, Mekran, and Uganda, tell what the Bombay Native Army of to-day can do.

² Our Indian Army and its generals learnt there and in Burma in 1828 their first lessons in mountain and jungle warfare. Pollock and Sale both served in the first Burmese war.

³ In 1850 or 1851, the original Nasiri Battalion became a Regular corps under the title of the "66th" or Gurkha Regiment. A new Nasiri Battalion, which only contained a percentage of Gurkhas in its ranks, was raised, and again disbanded after the Mutiny. The 66th is now the 1st Gurkha Rifles, the "Sirmoor Rifles" has become the "2nd (P.W.O.) Gurkha Rifles," and the Kumaon Battalion is now the "3rd Gurkha Rifles."

the staff of officers. These officers and their Gurkhas, saddled with one hundred or more native women and children (for both Englishmen and natives took their wives and children to Kabul in 1840, as if it had really become an Anglo-Indian cantonment), fought and suffered for fifteen days. Severe and continuous, day and night, as the fighting was their most terrible sufferings were caused by thirst, and thirst finally forced the survivors to try to fight their way out. Codrington and Salusbury had been killed, Eldred Pottinger shot in the leg, and Haughton had had his right hand cut off, and his neck and shoulders deeply gashed by a treacherous Punjabi, the Subadar of the native gunners, who had saved their own lives by deserting to the enemy. There were, it is said, at least twenty thousand Afghans swarming round the scarce defensible barracks of Charikar. On the 13th November, in the dead of night, Pottinger, Haughton, and all that was left of the Gurkhas, moved silently away from Charikar. Discipline, however, was soon gone. The Gurkhas got beyond control. They rushed madly for the first water they saw. Pottinger and Haughton, seeing that it was hopeless to guide and save the Gurkhas, determined to make an effort to save their own lives. A Gurkha orderly, a bunya, and a munshi alone accompanied them. Haughton was so badly wounded that he could do little more than sit on his horse. Once or twice he fell off. He even begged Major Pottinger to leave him to his fate, but the latter refused. How they moved on by night, and hid by day; how in the dead of the second night they rode through the City of Kabul, greeted once or twice by Afghan challenges and bullets, and how, finally, they reached the British cantonment, almost fainting from wounds and exhaustion, is a tale that attracted deep interest at the time, and is now well-nigh forgotten. The Afghans did not massacre the Gurkhas *en masse*. Many were kept as prisoners and slaves, and regained their liberty when Pollock and Nott re-occupied Kabul. One hundred and sixty-five went back with Haughton to India in October, 1842. Some turned Muhammadans and settled in Kohistan. In the second Afghan war our troops met several of these men. Lieut.-Colonel John Haughton mentions, in his letters to his father from 1882 to 1887, that Sir Herbert Macpherson, and Colonel Hammond and Major Carr of the 5th P.C., had all come across these *quondam* Gurkhas. Those who fought under Sale at Jalalabad, and Pollock in his advance on Kabul, belonged to George Broadfoot's sappers and miners. Gleig thus writes of them:—"Small men, but resolute and active, they ran from rock to rock with surprising celerity and delivered their fire with a degree of accuracy and a correctness of aim which won for them the applause of their European comrades. The officers and men of the 13th, although excellent skirmishers themselves, beheld the working of these wild mountaineers with delight." We may, I think, recognise here the forbears of the Gurkha scouts of Tirah.

SECOND PERIOD (1850-78).

The second period of our warfare with Pathan and Baluch produced some of the finest of our frontier generals. Foremost among them stands Sir Neville Chamberlain, the *doyen* of the Punjab Frontier Force. With

him we may mention Generals Sir Colin Campbell, Sir Sydney Cotton, Sir Harry Lumsden, Sir A. Wilde, Brigadier-General John Jacob, Sir Charles Brownlow, and Sir Charles Keyes. I cannot possibly enter here into details of the many expeditions in which these officers held either the supreme or a subordinate command. I propose merely to mention a few incidents, and quote certain orders and memoranda left on record by them. Of all the frontier fighting of this period that at Ambela (in the Black Mountain) was the sternest and severest.¹ The Crag and Eagle's Nest piquets are historic spots. The Crag piquet was taken and retaken three times; and the troops that retook it after a very stiff climb and a stubborn fight, were two British regiments—the 101st Bengal Fusiliers on the first occasion, and the 71st Highland Light Infantry on the second. In the Black Mountain Expedition of 1860 the 6th and 19th Foot and several batteries of horse and field artillery took part, and the general in command (Wilde) commented on their mobility, aptitude, and capacity for any kind of work, the cheerfulness with which they underwent all hardship and labour, and the exposure incidental to bivouacking, and added that they moved as light as native troops. This expedition remains a model of light equipment and mobility. If we may select one officer above his fellows for good service at Ambela, I think that man must be Major (afterwards Sir) Charles Brownlow. He it was who held that Crag piquet day and night with his well-known corps (he raised it), the 20th Punjab Infantry. The Pathans pressed him hard one night from ten o'clock till four a.m., but he held his own.

Our fighting with the Afridi began in 1850, when Sir Charles Napier himself accompanied a raid upon them. In 1855 we find Mr. (afterwards Sir Richard) Temple thus describing the race:—"As soldiers the Afridis are amongst the best on the frontier. They are good shots. Their tactics resemble those of the other tribes. They retreat before the foe as he advances and press upon him as he retires." We may recognise in this the Afridi of 1897.²

I need not dwell at any length on our experiences of frontier fighting since 1878. The most important and instructive of these Major C. F. Younghusband has recently brought to our notice in his well-written book on Indian frontier warfare. The features of the fighting in the second

¹ After the severe fighting at Ambela there seems to have been an outburst of literature on frontier fighting very similar, on a reduced scale, to that which appeared after Tirah. Colonel J. Adye produced "*Sitana*." Lieutenant C. M. MacGregor's "*Mountain Warfare*" ran through two editions. One or two officers lectured on the subject at the Royal United Service Institution, Whitehall.

² I must content myself with mentioning that Sir Sydney Cotton's "*Nine Years on the North-West Frontier, 1854-63*," and the appendix to "*Lumsden of the Guides*," give, from personal experience, all the main principles for conducting warfare with the frontier tribes; while Sir Neville Chamberlain's "*Standing Orders for Frontier Expeditions*" are given at the end of Paget's "*Expeditions against the N.W. Frontier Tribes*." On p. 388 of the same work will be found an extract from Brigadier N. Chamberlain's despatch on the Mahsud-Waziri Expedition of 1861, which gives in a nutshell the main features and principles of conducting a frontier expedition.

Afghan war do not differ from those that characterise the operations either before or after. There is one point, however, that occurs to me as noteworthy, and that is, that during the second Afghan war we hear but little of that incessant harrying of rear guards which figures so prominently in most expeditions on the North-West Frontier. The only case is one to which I have already referred, when the Alizais attacked near Kushk-i-Nakhud, Sir Michael Biddulph's rear guard, composed of a wing of the 2nd Baluchis and one or two squadrons of the 3rd Sindh Horse. The assailants were repulsed with heavy loss.

My study of Baluch tactics, as far as it has gone, shows that the Baluchis, when they do strike, strike more boldly and with less care for the safety of their own skins than the Pathans do. The columns under Lieutenant Clarke and Major Clibborn in 1842 were not harassed from the rear, but opposed, surrounded, and more or less annihilated. The Marris themselves lost heavily and did not shirk loss. These same tribes, Bugtis and Marris, were far more daring marauders than the Pathans have ever shown themselves. They raided in bodies, numbering at times from five hundred to one thousand men, as far as the Indus and Larkana. It was one of these raiding parties, seven hundred strong, that Merewether caught in 1847, and with one hundred and thirty-three sowars of the Sindh Horse destroyed almost to a man. You will remember the action fought early in 1898 between one thousand three hundred Baluchis under Baluch Khan and other chiefs, and Lieut.-Colonel Mayne with one hundred and fifty rifles, 3rd Baluch Battalion, thirty sowars of Jacob's Horse, and two guns. Those Baluchis did not resort to harassing tactics, but took up a defensive position, and fought it out. They got a very sound beating, losing some three hundred of their number. The defence of Sibi in March, 1841, is another proof of the stubborn fighting qualities of the Baluch. As everyone knows, the Baluch tribes are not keen about enlisting. The best men at present will not enlist. At the same time I hope to see a real Baluch regiment formed one of these days. I would begin by forming them into Imperial Service corps or levies under the control of British officers, and then gradually work them into Regular battalions. I think this is the course for the thin end of the wedge to take. We have a vast territory populated by the Baluch tribes extending from the Derajat to the Persian border, and our future frontier policy requires that its inhabitants should be for and with us in its defence. At present we seem to leave them and their country severely alone. There is excellent material among them both for horse and foot soldiers, and the sooner we learn how to utilise it the better.

When there exists so excellent a summary of the laws of frontier warfare as that from the pen of Colonel Neville, just published in the *Journal of the U.S.I. of India*, and so sound a little handbook as that of Captain Peach, it is useless for me here to repeat what they say. I will just try and say a few things that they do not say, or which seem to need further illustration. I want first of all to dwell on the importance of adopting the offensive always, if possible, against these tribesmen. General Nott always went for the Afghans, and backed his troops at odds

of five to one to thrash them on their own hills, and did it too. General Sir F. Roberts swept the Pathans off their hills at the Peiwar Kotal and Charasia, the British regiments (8th King's, and 72nd and 92nd Highlanders) bearing the brunt of the work. General Pollock, with the 9th, 13th, and 31st Regiments, supported by native troops, cleared the way from Jalalabad to Kabul in August and September, 1842. Both George Broadfoot and John Nicholson have left it on record that the Bengal sepoy, when led by Generals Nott and Pollock, always fought the Afghans successfully. Nott and Pollock never waited to be attacked. Now contrast with these the affair of Maiwand; and when I quote Maiwand, I instance only the tactics, not the troops. In my opinion all the troops fought as steadily as could be expected of sore-tried human nature, ordered to lie down, or sit, or stand for four or five mortal hours, without water, under a burning July sun. Maiwand was a defeat because the troops were not led promptly to the attack, but cooped up in a semi-circle to be pounded by the enemy's fire, hemmed in on all sides, and finally rushed by five or ten times their own number. Much criticism was expended at the time on the troops engaged there, especially by the Press of Upper India. In my opinion, that criticism was in a great measure false and unjust. Nothing could be more unsound than a captious criticism passed by the editor of "The Wolsley Series" in a note in Major J. F. Younghusband's "Frontier Warfare" (p. 121) on the Sindh Horse at Maiwand.

I said at the commencement of my lecture that the new feature of recent frontier warfare was the improved armament of the tribesmen. The writers in the forties and fifties are all agreed on the superiority of the jezail, over the Brown Bess.¹ Sir John Kaye tells us

¹ The "Baker" rifle, which was effective up to 500 yards, was used by the 95th Rifles as early as 1800 and throughout the Peninsular War. It appears that it was placed in the hands of riflemen only, because it was not considered a weapon suited for close action, against the musket and bayonet. Even the 43rd and 52nd, who formed part of the celebrated "Light Division," were, as I understand, armed with the musket. Still at Barba del Puerco the 95th, armed with this rifle, repulsed a night attack by the French; and at Tarbes, in March, 1814, the three battalions of the same corps attacked and ousted a French division from a very strong position. In 1810 an order signed by Thomas Graham (afterwards Lord Lynedoch) records that, "in other Armies the rifle is considered ill-calculated for close action with an enemy armed with musket and bayonet, but the 95th Regiment has proved that the rifle in the hands of the British soldier is a fully efficient weapon to enable him to defeat the French in the closest fight in whatever manner they may be armed." Despite this proof however, old "Brown Bess," with her effective range of a bare 200 yards, remained the fire-arm of the British infantry till 1853, the year after the "old Duke" died. One wonders if his affection for the arm that won his victories forbade his consenting to its being set aside. In India it was still in use during the Mutiny; and until 1858 it was the weapon with which our troops faced and defeated the frontier tribes. In 1858, in the expedition against Sitana, under Sir Sydney Cotton, the Enfield Rifle was used for the first time against the N.W. Frontier tribes by a detachment of the 98th Foot. Rifle regiments only had used it before in frontier warfare. Sir Sydney Cotton has left on record that it was most effective in checking the pursuit of the tribesmen during his retirement. (See "A British Rifleman," by Lieut.-Colonel Willoughby Verner, Introduction, pp. xvii, to xix. and p. 56; and Paget's N.W.F. Expeditions, p. 77.)

that "the British muskets were found no match for the Afghan jezails," and that "the Afghans shot down our men with ease, and laughed at the musket balls." Sir Vincent Eyre corroborates this. Captain Augustus Abbott writes (page 219) :—"The long rifles of the Afghan kill at eight hundred yards,¹ while our musket has not half that range, and we wage a most unequal war with the mountaineers, who never allow us to approach them within musket shot." In 1842 the Adjutant-General of the Bengal Army, Lumley, wrote to Brigadier Wilde at Peshawar, and suggested that he should arm his sepoys with jezails instead of muskets. Sir Sydney Cotton (page 83) says :—"The hillmen with their matchlocks are admirable shots after their own fashion. Their matchlocks are rifled, and were so long before we had rifles; usually they are good for six hundred yards or more. We had only old Brown Bess, good in those days for eighty yards on a pinch, clumsy, cumbersome, and quite worthless for hill warfare. These hill operations give little or no chance for the bayonet, and we could scarcely expect to get a chance of administering cold steel. The hill tribes are certainly the best light infantry in the world. They bound from precipice to precipice, and conceal themselves behind rocks, and, moreover, they are always in high training for their movements in the mountains. The odds, therefore, are all against the European soldiers in particular; indeed, against all soldiers of all colour of the plains. The ordinary arts of war, of which we boast, are valueless in such a country." Sir Sydney Cotton draws this picture from his own nine years' experience. On his later expeditions the troops had Enfield rifles, and very useful he found them. It is evident that in point of armament troops are, relatively to the Pathans, in some ways better off to-day than they were before the Enfield and Minié rifles were introduced. Still, the long-range rifle in the hands of these tribesmen has given them a power of molesting and inflicting loss on us which they had not before. It is possible, for instance, that the Dargai position might in the old days have been ignored, whereas in 1897 long-range rifle fire forced our generals to dislodge the Afridis from it. We are now obliged to push our piquets to a distance of a mile or more from camp. During the first three or four nights at Karappa, where less attention seems to have been paid to piqueting, our troops suffered severely from sniping. Instead of coming down into the open the tribesmen now harass our troops and transport from safe positions on the heights. Formerly the tribesmen had at least to come within effective reach of our guns, and sometimes cavalry. Now they can evade both. To secure our line of march we have to piquet heights, perhaps, a mile off the road. This causes great delay, wearies men and animals, and increases the risk of the baggage and rear guard being caught out after dark. Similarly, it involves greater trouble and risk in piqueting the camps and withdrawing the piquets, when the column marches.

When we consider the difficulty which we experience in guarding our convoys and baggage trains from the attacks of frontier foes, it

¹ I think this distance exaggerated. No other writer mentions such a range.

amounts to a conundrum to try and explain how the huge baggage columns of the first Afghan war were not looted more than they were. Do not suppose they escaped. Both Baluch and Pathan had at times a rich harvest. And yet the baggage of an army in 1840 was nothing to what it was in 1804. In that year Lord Lake, with eight thousand fighting-men, had sixty thousand followers, two hundred elephants, two hundred camels, and one hundred thousand bullocks. In 1805 he had an army of thirty thousand, with two hundred and seventy thousand followers. General Nott marched in 1842 from Kandahar to Kabul with seven thousand fighting-men, fourteen thousand followers, ten thousand public and private camels, besides bullocks, asses, mules, and ponies (numbers of those not given) and forty days' supplies. Yet he held his own, and protected his baggage. In 1838 the Bengal Division, under Sir W. Cotton, consisted of nine thousand five hundred fighting-men, thirty-eight thousand followers, and thirty thousand camels. The Baluchis plundered this column freely as it crossed Kachchi and ascended the Bolan. Mr. Stocqueler, in his "Life of Nott," draws a graphic and amusing picture of the baggage of those days. The officers, he says, regarded the expedition as an enormous picnic, and bought their own beasts of burden. When he, at Ferozepore, where the army assembled, offered an officer a few boxes of cigars, thinking to do a kindness, they were declined with "Oh! thanks; our mess has two camel-loads of the best Manillas." Among the articles which Mr. Stocqueler mentions as being "indispensable to the efficiency of every corps" are jams, pickles, cheroôts, potted fish, tinned meats, plate and glass, crockery, wax-candles, table-linen, dressing-cases, perfumes, Windsor soap, and eau de Cologne." They little thought, he concludes, that these articles were destined to adorn the toilettes of Baluchis and Brahuis. They were mostly looted between Sukkur and Quetta, and by the end of February, 1839, "there was not a drop of beer with the army," and both men and animals were threatened with starvation. When General Pollock ordered his officers, during the march to Kabul, to double up, four in a single-fly sepoy's pal, he was evidently exacting from them unwonted self-denial. If the shades of the army of the Indus could rise, what would they think of a *tente d'abri* or a Tirah bivouac! It was, however, Sir Charles Napier's energetic and determined character that dealt the decisive blow to the preposterous baggage trains of Indian armies. His comments on the subject are characteristic. I can only quote a few lines ("Napier's Life," Vol. II., page 272):—"Oh! the baggage! the baggage! it is enough to drive one mad. . . . I think it would reach from this to Pekin! They say I have done wonders in reducing it so much; but I have done nothing except appealing to the good sense of the officers and reducing my own baggage. It is said that no Indian general ever marched with less than sixteen camels for his own share, generally with several hundreds: Lord Keane had three hundred, Mr. Ross Bell, the Political, six hundred. I have four camels." Yet even Napier allowed field officers four, captains three, and subalterns two camels, whereas British soldiers had only twenty-eight pounds and natives sixteen pounds of kit

allowed to them. One would imagine that Sir Charles Napier had appealed more to the good sense of the soldier and sepoy than to that of the officer. In 1880 Sir F. Roberts marched from Kabul to Kandahar with ten thousand troops and about ten thousand mules and ponies. In Karappa camp on 26th October 1897, there were seventeen thousand troops, seventeen thousand followers, and twenty-four thousand animals. Despite reductions, however, our baggage columns and convoys in Tirah were protected only with the greatest difficulty, and not always with success. Colonel Haughton, it will be remembered, halted his baggage column for the night in the Dwatoi defile, and lost not a man or animal. It is a sound rule, both for troops and baggage, if pressed by Pathan guerillas and overtaken by darkness, to halt, close up, get into the best defensive position available, and spend the night there.¹ Experience has proved that Pathans will keep at a respectful distance from troops so posted. The great difficulty is to keep the transport drivers in order. How to do that is a problem not easy to solve. If, however, the decision to halt and take up a defensive position for the night is adopted in good time, the baggage being driven together as into a sort of laager, the transport driver then knows that his best chance of safety is to remain quiet in that laager, and do his duty.

The great difficulty of accomplishing anything but the shortest march with a large force between dawn and twilight is one of the strongest arguments in favour of not employing a large body of troops in any frontier expeditions. It means, moreover, denuding the Indian garrisons of troops which may be wanted in India itself, and it also entails increased expenditure. It is probable that on no occasion in Tirah were even five thousand men actually engaged in any one action, and sometimes only a fraction of the force present would be engaged. At the destruction of Thabi, for instance, the work was done by the 3rd Sikhs and 5th Gurkhas. On the other hand, with a large force the work of reconnaissance, survey, punishment, and destruction could be carried on more rapidly. There has been a growing tendency of late years to employ large forces in these frontier expeditions, but the advisability of doing so is doubtful. Our policy in India is to keep our troops free for an emergency: hence the new scheme for a tribal militia, the success of which has still to be tested.

I have still one or two remarks to make on points which have recently evoked some discussion and difference of opinion. I am no advocate of the revival of light companies, nor am I disposed to make too much of musketry training. When H. E. the late Commander-in-Chief in India issued his Farewell Order to the Indian Army, he did not find fault with the shooting, but with the insufficient training of our infantry in the theory and practice of hill-warfare. In the first place,

¹ Sir James Outram in 1856, when attacked at midnight by the Persians during his retirement from Borasjun, halted and brought his guns to the rear. He thus kept the Persians at bay till daybreak, and then attacked and defeated them. Outram served throughout the first Afghan war, and learnt all that the Pathan and the Baluch had to teach him.

whatever extra training we propose to give our troops in mountain-warfare and in musketry, I think that we shall all agree with Sir Wm. Gatacre, when he says that our soldiers cannot be called upon to undertake additional exercises. There is work enough already. Therefore, the desired training in hill-fighting and musketry must be obtained by introducing modifications of the existing parades and practices, more especially in the company and field training, and in the collective and field practices of musketry. Now, marksmanship is only one of the virtues that go to make a good hill-fighter. We want strength, wind, activity, and condition as well. I am in favour of modifying the existing system of musketry, which seems to me to unduly favour figures of merit and pot-hunting. Many of those men who are such steady shots at a target would be of little use on a hillside. Many of the regiments who have beautiful figures of merit would waste a little fortune in ammunition on the frontier. We want more musketry training in the "shikar" line, more marching and climbing and shooting combined. Now, as regards the proposal that we should form either light companies or light sections in each company, I am in favour of neither; I think that we want our infantry to be all, as far as possible, trained up to the same standard. Of course, some men will be better shots, some men stronger, some more enduring, some more active than others; and when special work has to be done captains will select from their companies the men best qualified to do it. An earnest endeavour, however, must be made to train all the men up to a certain standard of physical excellence and of skill in shooting. Many a man who makes bull's-eye after bull's-eye on a rifle range makes poor shooting on service. It is a question of condition and nerve; and the nerve that makes "possible" on a range is not always the nerve that checkmates the Pathan. Therefore I contend that the idea of taking the two hundred marksmen (as at present tested) of a battalion and forming them into light companies is unsound. These marksmen may be mere target-shots, without nerve, wind, endurance, or activity. My idea is, take men all round as you find them, and make the best of the average. If any special little bit of work has to be done, certainly pick your men for it. As for musketry prizes, my own experience is that, with the exception of the purely "pot-hunting class," men shoot their level best from personal pride and for the honour of shooting well. We want more ammunition to spend and fewer musketry returns, and no figures of merit. Let the inspecting officers decide, by what they see themselves, on the musketry proficiency of a corps.

Ambulance work in hill-warfare is too great a subject to take up at the tail-end of a lecture. I would merely deprecate the too general employment of combatants to remove their comrades to the rear. This is the duty of a properly organised army hospital corps, with its own escorts, transport, and establishment. Such a corps is a desideratum in India. It were well too if it could be assisted in time of war by private ambulance resources, which as yet do not exist in India. Major Corker, R.A.M.C., has brought out a little net for the removal of the wounded from the firing line. At Dalhousie last September I took six photo-

graphs to illustrate the use of this net, which I will now show you on the screen. (Plate 1.)

Lieut.-Colonel Henderson, the Professor of Military History at the Staff College, published in the *United Service Magazine* for August an article on "The Training of Infantry to Meet all Conditions of Warfare." He advocates the training of officers to assume responsibility, and to exercise their own judgment and to act on it. He wishes men and officers to be trained on the most varied ground and in varied formations, special attention being paid to training the individual skirmisher. He instances the Light Brigade in the Peninsula—the famous brigade which Sir John Moore trained and Craufurd led—as an example to follow, a recommendation endorsed by Lieut.-Colonel Willoughby Verner in his Introduction to "A British Rifleman." Despite the value that attaches to steady drill as an element of discipline, I think we must realise that steady parade drill and parade words of command are not rigidly adhered to in the heat of action. We do read of battalions manœuvring and being handled as steadily as on parade; but we also know that in the keen excitement of battle and the *élan* of the charge the placidity of parade is forgotten. This is more likely to be the case in these days of loose formations and "individual" fighting, than in the old shoulder-to-shoulder days. No doubt Colonel Henderson is right in deprecating additions to the Drill-Book, to meet all sorts of abnormal conditions. Nevertheless, I should be glad to see a good official manual on mountain and other forms of savage-warfare, compiled and issued to the Army. We do require some definite source from which we can learn what hard experience has taught our predecessors. The military educational staff both in Great Britain and in India must surely feel the need of such a manual; for as everyone knows, more especially those who have to pass garrison class and tactical examinations, the subject is one that has to be studied.

Among the officers holding the highest rank and the highest office are those who have the widest experience of savage-warfare. In a few years all that knowledge and experience, unless it be committed to paper, will be lost. It seems a pity. Of course, new men are always coming to the front, with a new harvest of experience of their own, but I should like to see the mantle of our great frontier leaders in the last fifty years of the nineteenth century handed down to the coming ones of the twentieth. That mantle, doubtless, if it does appear, will be cut square and bound in red in the good old time-honoured fashion which our drill-books affect; but if well written, it will teach grand lessons to the younger generation of soldiers.

General Sir HENRY W. NORMAN, G.C.B., G.C.M.G., C.I.E.:—I am sure we have all heard with the greatest possible interest the address that has been delivered by Major Yate, but I must express my regret that, perhaps owing to some accident, there is not a single member of the Council of the United Service Institution present to hear it. I think this is very much to be regretted. I agree with most of the things that Major Yate has said, but I think he has on one or two occasions departed somewhat from the printed proof of his lecture, which, I suppose, will be in the main that which is adopted in the publications of the

society. Therefore I will just make one or two observations in order to ensure accuracy as to historical facts. Major Yate seems to think that the Shah Shuja Contingent was mainly composed of Punjabi Muhammadans, except a Gurkha regiment or so. In point of fact, it was mainly composed of Hindustanis who were raised in the North-West Provinces, and a great many of those men remained faithful, and did very good service with Nott, and on other occasions, and came back into the Native Army afterwards. Some of the best non-commissioned officers in my regiment, the 31st—two or three of them I recollect perfectly—had been in the Shah Shuja Contingent, and were Oudh men, and proved very good soldiers later on. I also think there is some mistake about the defence of Kelat-i-Ghilzai. Major Yate says in the paper:—"The defence of Kelat-i-Ghilzai by 250 men of the old 43rd Bengal Infantry from November, 1841, to the end of May, 1842, when the final assault of the Afghans was successfully repulsed, etc." In point of fact, that defence was made by a regiment of the Shah Shuja Contingent, the 3rd Regiment, which became the present 12th Bengal Native Infantry. As part of the garrison there were two companies of the old 43rd Bengal Infantry, now the 6th Regiment. I am glad to see he quotes from Harry Lumsden as to Lord Clyde's conduct on occasions of engagements in the hills. It is said in the work "Lumsden and the Guides" that in all retirements he stuck doggedly to his rear guard until he saw the last of his column safely out of danger. I was staff officer to Lord Clyde in every engagement with the Afridis, Momands, Swaties, or any of the people on the Peshawar frontier, and I can quite bear this out, that is to say, that in retirements he always remained with the rear guard, and the rear guard was often the strongest part of the force. The advance guard was also strong, because companies or detachments were dropped by the officer commanding it, who was usually a selected officer, to take up positions while the baggage was passing along, and joined in with the rear guard. I have a vivid recollection of our rear guard in the Kohat Pass, when our rear got into difficulties with the Afridis. We should probably have been in much greater difficulty if we had not been very strong and had guns with us. We always endeavoured to have guns with our rear guard whenever it was possible to do so. With regard to the impedimenta of baggage, no doubt in those days there was some abuse: officers carried much more than they ought to have done; but you must always recollect that with an army there must be a large amount of provisions, stores, and ammunition. The officers' baggage is a mere flea-bite on the whole. I observed to-day or yesterday in one of the newspapers that 5,000 carts accompanied one of the columns of General Buller's force. I do not think that much of that was probably taken up by officers' baggage, but an enormous quantity of transport is required for provisions and ammunition. I was calculating in my own mind, and I do not think that those 5,000 carts drawn by bullocks, perhaps six or eight each, could have taken up less space than some twenty miles. I have seen large armies in the field in India, and one advantage that camels and mules have over carts is that they can often go off the roads, and spread over the country a good deal, and still be within their flanking parties. It is certain that we can never get rid of this terrible incubus of which Sir Charles Napier complained so much, namely, a great great deal of baggage; and of course in a country like that in which we are now operating against these Boers, most of whom seem to be mounted, it must be a very terrible business for any commander to provide a sufficient number of flankers to prevent the enemy cutting in on the baggage at some point or other. Major Yate said something about the rifles, but I think he made a mistake in stating that rifles were never used against border tribes until 1858. I have seen them used against border tribes in the year 1849-50, when we had the 60th Rifles with us, who in the Peninsular War had used these weapons as they did against the Afridis in the Kohat Pass, and against the Gusufzai tribes in 1849 and 1850. A company of my own regiment was also armed with rifles;

they were armed about the year 1843, and they used rifles against the Afridis in 1850.¹ But I quite agreed with the lecturer as to the great efficiency of the jezail, which, as he says, was in many cases rifled, and carried further than the musket, which was the usual weapon of the British and Indian soldier in those days. The only other thing I would say is with regard to the ambulance. From the picture which we were shown just now of a method of bringing soldiers out of battle, the idea seemed very ingenious and very handy, but I think that we must provide some other means of bringing them away. It is impossible to conceive that an army can go on fighting if for every man wounded three men or even two men who are not disabled go back with him to the rear. I do not think any general in command would like that. Whilst I am speaking about carrying off the wounded I must allude to a fact which is not generally known, that a large number of dhuli bearers are, I believe, at present at the Cape, and they render invaluable service, even under fire, in bringing off the wounded. I do not think I need say any more, except to express my entire concurrence with Major Yate's desire that more attention should be paid in writings and in lectures also, and at the Staff College and other places, to the necessity of impressing upon officers of the British Army the lessons which we have learned from our warfare with various savage tribes. Probably more attention has been given to the war between the French and Germans in the year 1870, a sort of war which is not likely to occur very often, and in which we shall hardly take a part, while I am afraid too little has been taught to British officers, except by hard practice and severe experience, in regard to our various operations in India and Africa, with people whom we do not consider to be disciplined.

Captain E. PEACH (Indian Staff Corps):—One point mentioned in the lecture struck me, and that was in regard to the armament of the Afridis in 1897, and what Major Yate said about the jezail. I notice that the last speaker mentioned that we had more rifles than, perhaps, the lecturer thought; but it occurred to me that in the days when the Afridi fought with the jezail, and we were badly armed with the Brown Bess, that at any rate in order to use the jezail the Afridi had to come within at least 600 or 800 yards of our men, and his position was marked by a very palpable puff of smoke, and all along his position these puffs of smoke could be observed. In 1897 we could not see the Afridi at all, and therefore a flank movement (which is so vitally important) was very difficult to carry out. It was impossible to tell where the enemy's position began or ended, which is apparently the case in the Transvaal at the present moment. In the attempt to pass round an Afridi position troops were always liable to fall into a trap, just as we read in the papers to-day a patrol of the New South Wales Lancers came suddenly upon one kopje after another and found the Boers occupying each. With the present rifles the enemy's position is entirely masked, and it is difficult to get close enough to reconnoitre. It is in points like these that I think the 1897 campaign differs from the former frontier campaigns described by the lecturer. But I thoroughly agree that we somehow do not always manage to learn as much as we might from our previous experience. For instance, a great many of the lessons learnt in the Afridi campaign seem to apply to South Africa. We learned there to give up all idea of making a "big bag" of the enemy, and to endeavour rather to carry out our invasion of the country with as little loss to ourselves as possible, and not to expect pitched battles, which, indeed, the enemy would never accept unless they were well under cover. It appears to be much the same with the Boers. I have often heard the Boer and the Afridi compared by officers who knew both, and it is surprising in how many points they resemble each other. If, therefore, we had made little more use of our experience gained in Tirah, and if the tactics employed had been a little better known in England, it is possible that some of our losses might have been saved at the Cape.

¹ I may mention the infantry of the famous Corps of Guides raised in 1846, and since 1849 constantly engaged in the North-West Frontier, have never had any weapon except the rifle.—H. W. N.

Major A. C. YATE, in reply, said :—I did not expect to have the honour of having Sir Henry Norman here to speak at a discussion on my paper. I think the remarks of one who has seen frontier warfare in the forties are extremely valuable, and I only wish that more old soldiers would come and say here what they have themselves seen ; because they have seen with their own eyes infinitely more than a student, with all the reading he can get through, is able to ascertain. I have, for instance, been doing my level best to find out when the rifle was first used, and I came to the conclusion that it was first used in 1858. Indeed, I found that specifically stated in Paget's "North-West Frontier Expeditions," and corroborated indirectly by Sir Sydney Cotton's Autobiography ; but Sir Henry Norman has told us that the 60th Rifles were using the rifle on the frontier in 1849-50. I was aware that Shah Shuja's Contingent was not mainly composed of Gurkhas ; I did not mean my lecture to convey that impression at all. I specially mentioned the Gurkha regiment because it did such excellent service. The gunners ("Yolándaz") of Shah Shuja's Contingent were Panjabi Mohammedans. It was they who were so disloyal to Haughton at Charikar. They deserted him in the hour of need, and cut him down. They could not resist the temptation to save their own lives. Of the Panjabi Muhammadan as a fighting class I have a high opinion. I have two companies of them in my own regiment, and value them highly. I was not aware that any portion of Shah Shuja's Contingent aided in the defence of Kelat-i-Ghilzai. I thought the 43rd Bengal N.I. alone defended it. I gathered that from Kaye and other writers. I will, in future, bear in mind that the 3rd (Hindustani) Regiment of the Shah Shuja Contingent aided in the defence.

Sir HENRY NORMAN :—It was the 3rd Infantry of the Contingent, now the 12th (Bengal N.I.)

Major A. C. YATE :—Yes, sir. Sir Henry Norman has dwelt on the point of the removal of the wounded from the firing line by combatants. It is a most difficult question. It is no easy matter to take right into the firing line a lot of stretcher-bearers ; at the same time, it is a most fatal thing to denude the firing line by taking combatants away to the rear. It is too big a question, however, to enter upon now. One thing is certain, viz., that special expedients will always have to be devised to meet the stress of the moment, despite our utmost prescience and preparation. Captain Peach has been so good as to emphasise what I said in my lecture about the difference in the conditions of frontier warfare brought about by the introduction among the tribesmen of long-range rifles and smokeless powder.

The CHAIRMAN (Colonel Sir Thomas H. Holdich) :—I think we should miss something of the point of Major Yate's lecture if we did not take account of the lessons it teaches. One which strikes me most forcibly is the value that the North-West Frontier is to us as a training-ground for our soldiers. It has been for all the time that Major Yate has described, and for much longer, a great training ground for the British Army, because these little wars are constantly occurring, and the value not only of British troops, but of British officers, is always being tested there. I think we have had recently a very forcible example of the value of the teaching that we gain from the Indian frontier, not only in the matter of instructing officers and men in their duties, but in the still wider matters of equipment and transport. It could only have been from India that we could have despatched ten thousand men at short notice to stem the whole tide of a Boer invasion until troops could be sent from a distance of 6,000 miles to assist them. But while I quite agree that the teaching of our experiences with the Afridis tends to show the necessity for instructing the British soldier in arts of warfare somewhat different from those to which he has been generally accustomed, from what I myself have observed, I should say that is a principle which might very easily be carried too far. It is just as hopeless to expect the heavily-booted and heavily handicapped British soldier to compete with an Afridi over his own hills as it is

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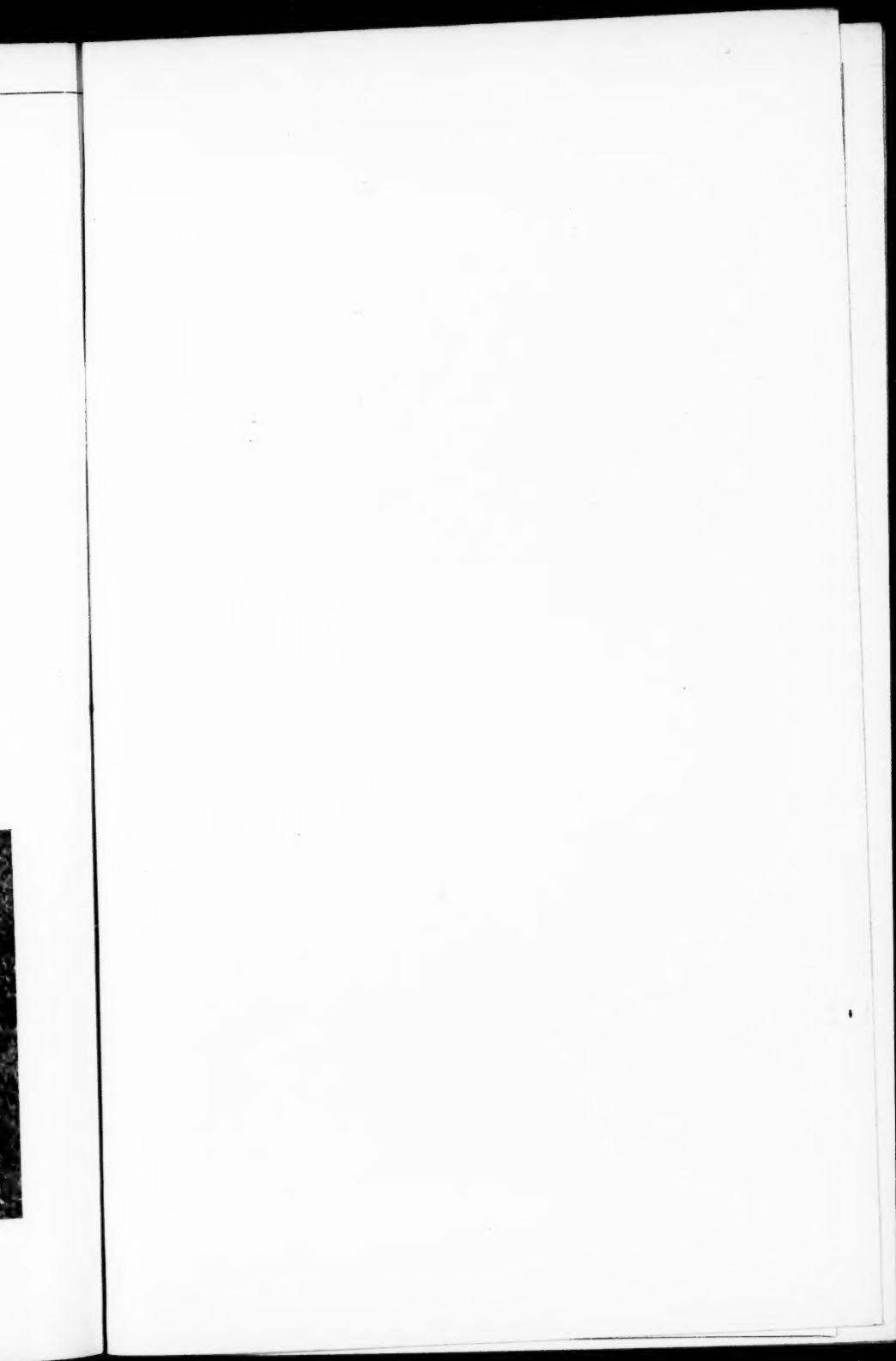
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THE NET.



PREPARING TO MOVE ON.





ON THE MOVE—DOWN HILL



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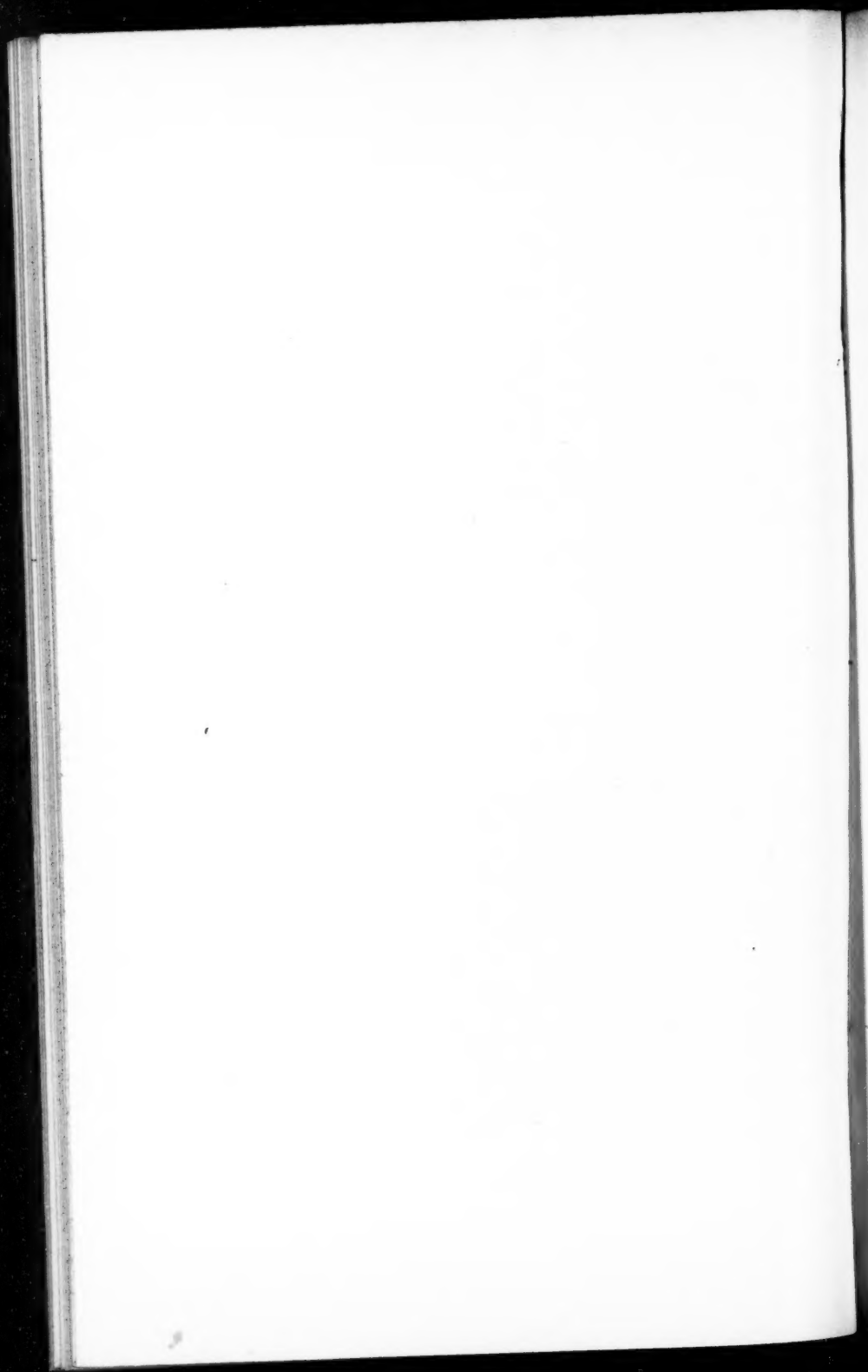
THE CORKER NET.



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to expect him, when he is put into the saddle, to turn into a Boer or a Cossack. Neither his upbringing nor his country training has fitted him for either vocation. It seems to me that there is just a possibility that we might weaken some of those solid characteristics of British fighting which we know the British soldier is most eminently fitted to sustain by training him to emulate undisciplined irregulars. There is one other danger which, I think, has been rather forced upon our attention by Major Yate's lecture, and that is, the danger of allowing a people so near to us, so immediately on our own borders as Afridis and Afghans, to arm themselves with long-range rifles. This is a danger with which it is so exceedingly difficult to deal, that I do not pretend to enter into any discussion on the subject. But there is a risk, if they are to be so armed, that we may repeat the mistake which many of us have recently made, of underrating the strength of our adversary, especially as regards Afghans. I have a certain amount of acquaintance with the Afghan people, having lived nearly four years of my life in Afghanistan; and, although I have never actually served with Afghan soldiers, yet I may say that I have on several occasions made considerable use of them. The first occasion was when it became suddenly necessary to reconstruct the defences of Herat at the time when there was every possible chance that we might have to defend that place against Russia. It was a work of very considerable magnitude, which employed thousands of men. The celerity with which that work was accomplished, the energy which was thrown into the working of it, and the thoroughness with which it was all done, is a matter of surprise to me even now. Another occasion was when I was in the Kunar Valley at the time when Chitral was under siege. We were in a rather difficult position, for we had to lay down a boundary right in face of the Chitral Valley, where all the fighting was going on. On that occasion it was necessary to reach some point from which the Chitral Valley could be overlooked, and it could only be done by passing through the wilds of the most tangled mountain wilderness I have ever seen in the Himalaya. For the purpose of supporting this reconnaissance, I had 500 Afghan troops, who were more or less drawn from Regular regiments, and 500 *kossidars*, or irregular troops, who preceded the Regulars; that is to say, 1,000 men in all. They marched for a ten-days' trip into a country which they certainly had never seen before, over roads which I really think no British soldier could possibly have traversed, without transport, without commissariat, without medical assistance, without equipment of any sort; and at the end of a six-days' journey through this country they were asked to climb a mountain 11,000 feet high, through snow at the top which was pretty nearly waist-deep. They did it, and we all got safely back again, having obtained all the surveys necessary for the laying out of that boundary. As far as I know, not a single man of the number was very much the worse for it, and I certainly never heard a single complaint. These are people whom we cannot afford exactly to despise. But there are two things which the Afghan requires in order to turn him into a formidable enemy—one is long-range rifle and artillery fire, which he is gradually acquiring; the other is good leading—good officering. As I say, as regards the weapons, thanks to our free-trade principles, it seems to me he is likely to get them; but as regards leading, that is entirely another question. I believe that that depends upon the side from which danger to the independence of Afghanistan may first appear. If we are the first to overstep the limits of her independence, then we shall probably find very much the same leading there against us as we find now in the Transvaal. If, on the other hand, the very unlikely mistake should be made of an invasion from the northern side, I think the Afghans would not only receive us, but would welcome us as officers to lead them to what they would feel was pretty certain victory; for they have great confidence in British officers. I think I need not detain you more than to ask you to join me in thanking Major Yate for his very interesting and able lecture.

TACTICS IN THE JANE NAVAL WAR GAME, AS EXHIBITED IN VARIOUS NAVIES.

By F. T. JANE, Esq.

Wednesday, 6th December, 1899.

Captain R. S. LOWRY, R.N., in the Chair.

IN the discussion—unfortunately a meagre one—which followed a paper that I read at this Institution some eighteen months ago, certain points were raised to which there was then no definite answer possible. The game was too much in its infancy to allow of anything getting much beyond the range of suggestion. I think I may say, however, that certain *pros* and *cons* were accepted as postulates for the time being, and I may perhaps tabulate them as follows:—

- a.* That the game was of utility in teaching the strong and weak points of war-ships.
- b.* That its tactical utility was small.
- c.* That its strategical utility was nil.

I think this fairly represents the decision that was come to, mentally perhaps rather than verbally, and with a more or less open mind in all cases, because few of those present had participated in a game, and of those who had their games had been distinctly elementary. The game that followed my last paper was interesting, but it was not of a nature to create respect for its technical qualities—I mean, that though it brought out the question of strong and weak points of ships well enough, it certainly did not exhibit anything in the way of tactics. None of the players had much familiarity with the game, some indeed had never seen it before, and all their energies were taken up in mastering its first principles. However, I fancy the conclusions I have tabulated were at that time quite correct.

Since then the game has been published, and I have had opportunities of seeing it played by, and of playing it with, naval officers of most nationalities; and the value of this, providing a field of infinitely wider criticism, cannot be over-estimated. It is all very well for a game of this sort to sail along under my name as its inventor, but a thing of this scope cannot be a one-man invention. Of the game as I evolved it many years ago, very little now remains save the models! It would be tedious to relate how the evolution proceeded; but I could name over a hundred people who by criticism have assisted in it, and between them done the

lion's share of the work. And here I may say, and I hope it will be remembered presently in the discussion, that it is the captious, or seemingly captious, critic who has generally helped most. The kindly critic is apt to remember too much that the thing is a kriegspiel, and criticise accordingly; the captious one refers to the real thing. Moreover, he turns his fire upon small details; and small details are everything here. I am convinced that broad facts are almost non-essential to a kriegspiel; whether they are covered by conventions or no signifies little. For example, turning is worked upon an absolute convention; and though nearly everyone who is beginning the game writes to me pointing out how much better it would be to use dividers, and work turning circles and so on quite accurately, they soon go back to the convention. Even for ram and torpedo tactics the convention is in practice better than the more elaborate system, because these things are so easily decided by sight and common sense.

Here, *en passant*, I may remark that there rarely are any ram or torpedo actions when officers who know the game well are engaged. They may use a torpedo to settle a disabled ship; but while the action is young, one or both sides are bent upon keeping out of a range at which misses are nearly impossible; three thousand yards is the favourite range, as a rule. Sometimes it is greater still. In the battle of which photographs lie on the table below, several hours were spent in manoeuvring the ships out of range altogether. It began at eight and lasted till four a.m.; and out of this time the final half an hour only was spent within range. If the players had not grown sleepy, I doubt if they would have closed even then.

To resume, let us consider some more or less minor detail of the game, say the case of big guns trained to starboard, and the enemy passing to port. Actually such a case would be of the first importance. It is met by the turrets for big guns in the models being movable, which sounds a minor detail enough. Unfortunately this entails a certain amount of bother and time, so there is an alternative system of making each player note the side towards which his big guns are turned the move *before* he fires them.

This is one item at haphazard out of several scores that have had to be thought out. The solutions are absurdly simple, but these obvious solutions are always the hardest to arrive at; and, but for the captious critics, probably never would have been arrived at. The more kindly critic says:—"Oh, that sort of thing can be assumed; I'm not going to attack you upon little quibbles like that." But it is to forging rules to bind players over such quibbles that the last eighteen months have been spent. In the excitement of a game a player won't pause to consider things of this sort unless he is compelled to by rules. In real battle he would be compelled to by facts. For a kriegspiel to be of value, it must also compel him to think of as many things as possible out of the things he would have to think of in action. A kriegspiel cannot be played for mere amusement; any officer playing will unconsciously put all his theories into it, and if he can do a thing successfully at kriegspiel, he will in time (very possibly, still unconsciously) come to regard it as a

thing that can be successfully done in war. Hence the absolute importance of attention to minor details, and the value of the captious critic.

And now I may turn to tactics. Whatever may have stood for truth about it in the past, I claim that in its present form the game is useful tactically. Before a body of professional opinion I make the claim with all deference; still I make it, and am prepared to stand or fall by it. And I make it for various reasons. In the first place, no, say, Russian officer acts in the game as, say, a Japanese. With the officers of these two Navies I have played more games than with any other, and have invariably been struck by the difference in the way they play. Our people again are different (though ours vary much, and exhibit individuality, good, bad, and indifferent). The French are different again, and so on.

By tactics, I here mean battle formations, methods adopted in order to try and get the whole of one force concentrated upon part of another, both before and during an action, the general orders as to firing, and all that sort of thing. That all-important part of tactics, the ability of *personnel*, cannot, of course, enter into a *kriegspiel*. Still, for all other things that can be put under the head of tactics, this difference in methods is very marked; and of all the fleet actions that I have seen, victory—given forces anything like equal—has always gone to the side whose tactics were the best for the occasion. Luck or skill at gunnery has nearly always been second fiddle to tactics. And where a disparity of force has existed, the game seems to have produced results approximating to what is generally expected in real war, or what real war has more or less proved. For instance, the weaker fleet's best chance is to close, so as to equalise matters as much as may be by torpedoes; while the stronger a fleet is, the further it should keep away. I believe this result fits the theories of those who have studied the matter most. Again, there is the line-ahead or line-abreast problem. These can to a certain extent be treated as chess problems; to each there is the reply that may lead to victory, to each the reply that may do the other thing. From what I have seen of the game, line-abreast seems best in it against a stronger force, if close quarters is intended. It is easier to avoid coming to close quarters in detail, and there is less chance of ships masking each other when some get disabled. But, given a smart enough enemy it has often led to disaster. The why and wherefore is not easily worked out on paper; but, later on, I shall be pleased to show on the war-game board the favourite manœuvres in this direction. When all is said and done, it has always seemed to depend upon the enemy whether line-abreast has had to be converted into line-ahead, or *vice versa*.

And this brings in the problem of feints. A feint so often proves the key-note of the whole thing. The Russian Navy is the only place where I have seen very much attention bestowed upon tactics of this sort; some of them have certainly been eye-openers. To perform them with real ships, problems of handling would, of course, come in—the ability to handle all the real ships might, or might not, be wanting. But so far as the admiral's share is concerned, some of the Russian

manœuvres on the war game board were brilliant. It is not for me to venture on opinions as to the efficiency of the Russians as sailors, but as tacticians they certainly display an originality that I have not seen displayed anywhere else.

Of course there is a reason for it. When Russian officers play a war game, other officers make notes and charts of what they do, and next day the players have to give their reasons. That giving the reason is a key of the situation. I need not enlarge upon it in this brief paper, beyond remarking that inability to give good reasons does not assist their promotion. They have introduced in playing certain innovations which, in my opinion, are out of harmony with the game as a whole; however, they are bound to win by tactics only. *En passant*, I may remark that in Russia the command of kriegspiel fleets is usually taken by admirals, or by captains who soon will be admirals, and that they play the things which they would have to do in war. That they do so, is in the first place due to the energy and initiative of the Grand Duke Alexander, whose reputation as a keen and able naval officer is not, I think, confined to the Imperial Russian Navy.

The Grand Duke Alexander's principal innovation was a gunnery matter. It was clear that too good shooting was made under the old system; and so he worked out a scheme from firing returns, and from the Yalu and Santiago percentages. This certainly made for realism; but by it a twelve-inch could only hit three times in half-an-hour at the most instead of about fifteen, as it used to be, or seven times, as we now have it. Three hits in half-an-hour, or rather three *chances* to hit (because these might all be misses) may be realism; but it seems out of harmony with the general idea, because everything all round in the game is assumed to be rather "A 1," and tactics based on bad gunnery on the enemy's part do not seem quite at home in a kriegspiel. There was the additional problem of how to deal with the player who saved up his three shots, or used them all in the first five moves. However, this evolved itself into a new rate of fire rule in the end. With a few changes the original rates were multiplied by six. My own system has been to multiply by two only—to give a twelve-inch a *chance* to hit every four minutes; but to also cover the target with a sheet of paper, so that at any range over two thousand yards, it is firing "into the brown." Taking one war-game battle with another the percentage of hits secured is by no means as good as that secured at actual target practice, so, presumably, we are not far from actual battle results. It is curious that this important point of percentages was never raised till the game was played in Russia. Possibly it is due to the fact that the Russians take it so much *au sérieux*; and—well, Nelson's famous saying, "Out-manceuvre a Russian," is always at the back of their heads.

Next to the Russians, the Japanese are the people who take most to kriegspiel. I do not know that they go in for the game like the Russians do, but all their new ships have sets on board, and when a party of officers of any ship building pay a visit to Portsmouth, they invariably come and play war games with me. I need not attempt to draw

comparisons between Japanese tactics and Russian; indeed, they differ so completely that it would hardly be possible. The Japanese have two main ideas, and of these Admiral Ito rendered one classical at Yalu, when he went right across the Chinese front. I believe this manœuvre has been much criticised and condemned; it is not for me to attempt to give opinions on it. But, so far as war game is concerned, if fleets more or less equivalent to the rival Navies at Yalu are made up, Admiral Ito's tactics appear the only rational ones. So far as that battle works out in war game, going to the port end of the Chinese line would have spelt disaster, for it would have compelled a close-range action. And wars game cruisers do not do well if battle-ships get near them, unless the battle-ships are handled very badly indeed. Admiral Ito's move caused the Chinese to draw out, and enabled him to cut some off in detail. He risked, of course, having some ships of his own cut off also, but he kept all his best ships together and acting as a whole, while the Chinese had to act individually.

At times, of course, a game on the theory of a cruiser rushing a battle-ship has been worked out to the latter's disadvantage, but generally, or always, because the battle-ship has closed also. When the battle-ship has kept away, the cruiser has always been smashed up. Indeed, I have noticed—as I have before remarked—that to keep away is (in war games) *the one thing the stronger should do*; and when one comes to theories of real war, I believe this is fully in line with Captain H. J. May's observations in past numbers of the JOURNAL of this Institution.

To return to the Japanese. Their other favourite formation, the S-shaped line ahead, is pretty well known, and has been very favourably and very adversely criticised. So far as war game is concerned, its success depends upon how it is met—but it certainly takes some meeting. It is also noteworthy, because it thinks of the big guns and the interim minutes while these are loading and training.

As for the French, who have the game in one or two ships, I have not seen enough of their play to say much. But such as I have seen is more like the Russian than any other, though it has some distinguishing characteristics, such as developments of retreating tactics, and making the most of the fact that stern guns generally shoot better than bow ones; and such tactics are, of course, particularly useful against soft-enders, besides suggesting possibilities with submarine boats left in the line of retreat.

Of German play I know nothing; they have the game, but I have not played it with any of them. I have no doubt, however, but that it is characteristic also, and probably serious.

I need not go through with all the Navies; though, in conclusion, I may be allowed a word about the British Navy in connection with the game. The British Navy, as a whole, is opposed to anything that seems to smack of "theory." I only know of three officers who have gone seriously into the game, that is to say, played it with a view to *utility rather than interest*; in each case they requested me to keep quiet as to their interest, "lest they might get reputations as theorists, and so find

promotion impeded." For the rest—well, there are game sets in a good many of our ships, but the apparent complication of the book of rules has prevented any serious attempt at playing. This is obviously the fault of the rules in the first place, and I will not deny that the accusation is correct. It is, I am afraid, absolutely impossible for a player to "get the hang" of the game except from someone who knows the ropes. Perhaps it is unavoidable; anyway the fact remains.

I do not know that they have lost much. In certain ships I have attended at games, and they have been, shall I say, too interesting to prove instructive. Few of our naval officers have the time to spare to play the game as they might play billiards; and, even if they had, a recreation is a recreation, and there it ends. It is not for me to presume to deliver a judgment upon the still vexed question as to whether the game is useful and instructive or not. But this much I can say: It can never be of use save officially, because it needs more time and thought than can be spared for a mere amusement. Experience, too, has lately taught the necessity of combining a more or less complicated strategical war with the tactical battles. In such, each player is given one ship to look after all through. A "war" that we have lately had at Portsmouth is too long and complicated for more than a brief reference here; but I may say that, acting as general supervisor of the affair, nothing struck me more forcibly than the tremendous difference that this "state of war" produced. That is to say, although all our "admirals" had had plenty of practice, some of our "captains" had had very little. Yet these thought more of their tactics than in a merely pre-arranged action "admirals" have ever done. The "war" being the private affair of a few enthusiasts, we could not, like the Russians, make each man give his reasons afterwards, but both "governments" had the power to put out of the game any "captain" who did not give satisfaction. As many here before me are aware, the ordinary pre-arranged battle has never meant more than putting a lot of ships up one end of the table, and another lot up at the other. Then they "go for each other" on a "devil take the hindmost" sort of principle. But in this "war," none of the players were anxious to be left out of it because they had lost their ships for preventible reasons. Every ship was thoroughly studied, and fought in action so as to make the most of her. And of some quite weak ships a good deal was made, the old "Benbow," for instance, did unexpectedly well. The weak points of every ship were noted, and forms of gun attack based thereon laid down in the event of the enemy trying such and such a manœuvre. How to get the greatest number of your own guns bearing upon the least possible number of the enemy's, how to torpedo an enemy in such a position that his chance to reply was small; these and kindred things came in for much study. On a war-game board they are relatively easy, though considerably harder than those little experienced in the game will believe.

One fact I would mention is that our players were not all British naval officers; there were more ships than would go round with them.

Two of the Blue "admirals" were Japanese lieutenants, and we drew some of our captains from marines, also from the sappers and gunners, all of whom have an indirect connection with ships, and a very comprehensive acquaintance with the weak points of every type. The gunners in particular go in for what Captain Orde Browne calls "discriminating fire," and singularly annoying they made it now and then. Their favourite proverb, "Common sense and common shell," was often illustrated.

As regards the strategical aspects of the "war," I am afraid that the "fleet in being" proved illusionary so far as protecting coasts was concerned, even though we gave it wireless telegraph and unlimited scouts. The coaling problem intervened, and the possession of submarine boats by the Red side—though it had no "moral effect" upon the Blue, and led to little loss—made blockaders chary. It really came out that, when the weaker was foolish enough to fight, he got smashed; but when he was wise and stuck to a *guerre de course*, the "fleet in being" of battle-ships scarcely affected his movements at all, and this side had not enough soldiers to capture the Red bases. Destroyers were the only answer to a *guerre de course*, beyond "reprisals." All of this is of course a little beside the point. I mention it, however, to show that the strategical game, as it now stands, goes a great deal further than the crude and elementary one in the book of rules. Fuller particulars concerning it will be published in the JOURNAL of this Institution at some later date.

To return to tactics. We found that all this showy realism, coupled with limited supplies of coal and ammunition, opened an immensely better field for tactical games, and suggested all sorts of manœuvres before ships came into range, that would hardly have been tested otherwise. It must be understood that I do not claim that any tactical problems were solved thereby—I leave it to others to settle that, but some kind of light was certainly shed on certain obscure points. If time admits after the discussion, it will, I hope, be possible to arrange a game, based on, let us say, a weak fleet which is compelled by circumstances to encounter a much stronger one, and while avoiding a general action, endeavour to destroy the stronger in detail.

This I think is all that I need now say, unless, in anticipation of a possible question, I say that the game has received some kind of official attention from every Government save the British. All I desire in that connection is the appointment of a few senior officers, specialists, to investigate the game more than is possible by watching or participating in a solitary action. In view of the line taken by foreign nations, this appears to me not unreasonable. The comparative absolute failure of the game at Greenwich Naval College, where Captain Login was kind enough to spend a great deal of time and labour in introducing it, indicates pretty clearly that it cannot be run on what—for want of a better term—I may call the level of chess or billiards. On such voluntary lines—necessarily hurried, necessarily in competition with studies—it cannot have a chance of being useful. The only system by which it can be made useful is that which the Grand Duke Alexander has initiated in Russia, and the value of that can only be ascertained by investigation and experiment that can only be made more or less officially.

I have purposely kept the paper brief. Discussion and demonstration upon the war-game board seem more likely to be useful than any words of mine upon the matter, because I must necessarily be under suspicion of viewing my invention with rose-coloured spectacles.

The game which followed this paper was not of especial interest, and yielded but small scope for tactics.

A few weeks later a game of an essentially tactical order was played on board H.M.S. "Mars," some description of which is here given:—

The fleets were:—

Red.—Four "Majestic" class. Speed allowed, fifteen knots.

Blue.—Four "Bouvet" type. Speed allowed, eighteen knots.

Structurally the "Majestics" are of a much superior type: any victory for the "Bouvets" was, therefore, only to be obtained by superior tactics. In order to get something of the nature of a demonstration out of the game, it was laid down beforehand that the "Majestics" should more or less act on the rush to close quarters principle, while the "Bouvets" were under no such restrictions.

The fleets encountered each other in parallel lines, both moving in line ahead in the same direction at about four thousand yards range. At this distance scarcely any hits were secured, and the Blue fleet, having forged ahead of the Red, altered course eight points simultaneously. The Red fleet was moving very slowly; the Blue went into line ahead again and passed them, exchanging broadsides at about three thousand yards. The course of the Blue fleet was a series of S's, in order to bring both the amidship big guns to bear. In this stage of the battle the "Prince George" was hit by a big shell on the water-line forward, and the "Carnot," struck by a big shell amidships, was of little service to her side.

Red now altered course twelve points in succession, intending to close (Fig. 2) with the sternmost ship or cut the line. Blue seeing Red's intention, altered course sixteen points as though intending to meet the Red line ahead in line abreast; then altering again, the three leading ships came across the "Majestic's" bow in an echeloned formation. The "Mars" and "Prince George" were entirely masked, and the "Hannibal" little better.

Meanwhile, the "Carnot," disabled, had gone right away to port of the Blue line.

The "Bouvet," "Martel," and "Masséna," all, or nearly all, discharged torpedoes at the "Majestic" as their tubes bore, and settled her, without her having a chance in reply. Altering course to port eight points, together, the three Blue ships came down towards the end of the Red line. In doing so the "Martel" and "Hannibal" mutually torpedoed each other.

The "Carnot" had by now turned. The "Prince George," unable to follow her next ahead, had turned off to meet her; the "Mars" did the same. Neglecting the "Carnot," these two ships poured raking broadsides into the "Bouvet" and "Masséna," at the same time slowing down

in hopes of an opportunity to bring their after submerged tubes to bear. Blue, however, was too wary for that, and turned away, and fought a stern action. The "Carnot" was only able to fight two big guns, but her speed being still equal to the twelve knots to which the "Mars" and "Prince George" were now reduced, she managed to prevent those two from acting together.

The torpedoed "Majestic" had now re-opened fire with her Q.F. guns, so the "Bouvet" gave her a second torpedo. The "Masséna," circling round, did the like for the "Hannibal." Right away to port, nearly out of range, the "Prince George" and "Carnot" were having a torpedo action, ultimately (and after several misses) decided in favour of the former. The "Bouvet" came back to attack the "Mars"; the "Masséna," apparently unable to decide which of her friends to support, remained far away from either. The "Mars" engaged her with her stern big guns (the bow ones were out of action), and presently the "Masséna" turned away. The "Bouvet" and "Mars" attempted a torpedo action, circling round each other at extreme range; but the torpedoes missed. The "Mars" having four tubes to the "Bouvet's" two, the latter presently gave up the contest and withdrew, still able to make full speed, but much reduced in gun-power. The "Mars" was in little better plight—but players had no means of knowing what damage they had inflicted, and her condition was not guessed.

At this stage the battle was stopped. It was held to be demonstrated that the Red fleet by closing had thrown away two ships without any equally corresponding gain; that had it taken advantage of its being the stronger fleet and kept away as much as possible it would have destroyed the Blues without much loss, or if these, by virtue of their superior speed, had attempted to force a close action, Red, by passing across their front, could have torpedoed them all from its stern tubes.

In all the "Majestics" the twelve-pounders on the upper-deck amidships were put out of action almost at once. The 4-inch guns of the "Bouvet," carried high up and without any bulwarks to act as shell-bursters, were never hit once. Two 4-inch Q.F. guns were put out in the "Masséna" by the very off-chance of a twelve-inch shot happening to hit one of them.

The CHAIRMAN (Captain R. S. Lowry, R.N.) :— If no one wishes to make any remarks, the most practical way in which we can learn the usefulness of this game is by asking Mr. Jane to try and start a game before our eyes, if possible. I will only say a very few words in thanking him for his lecture. I have not seen the game played for some considerable time, about two and a half years. I think we must all feel very grateful to Mr. Jane for taking the very great pains and trouble which he has done in going about the world and playing with officers of different Navies, and going to a great deal of trouble and expense in developing the game as he has. Whether we agree with all the changes that have been made in the principles of the game or not, we cannot but feel very grateful to Mr. Jane for so helping us to study what is the most important question of our profession: how to handle the ships which our country commits to our charge. In the remarks that he made about the previous lecture as to the utility of the game, he said that one of the conclusions that seemed to have followed was that the tactical utility was small. I did not gather that. Certainly, from those officers with whom I have spoken on

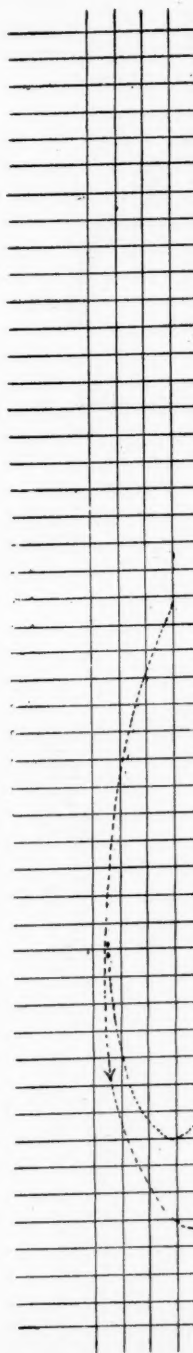
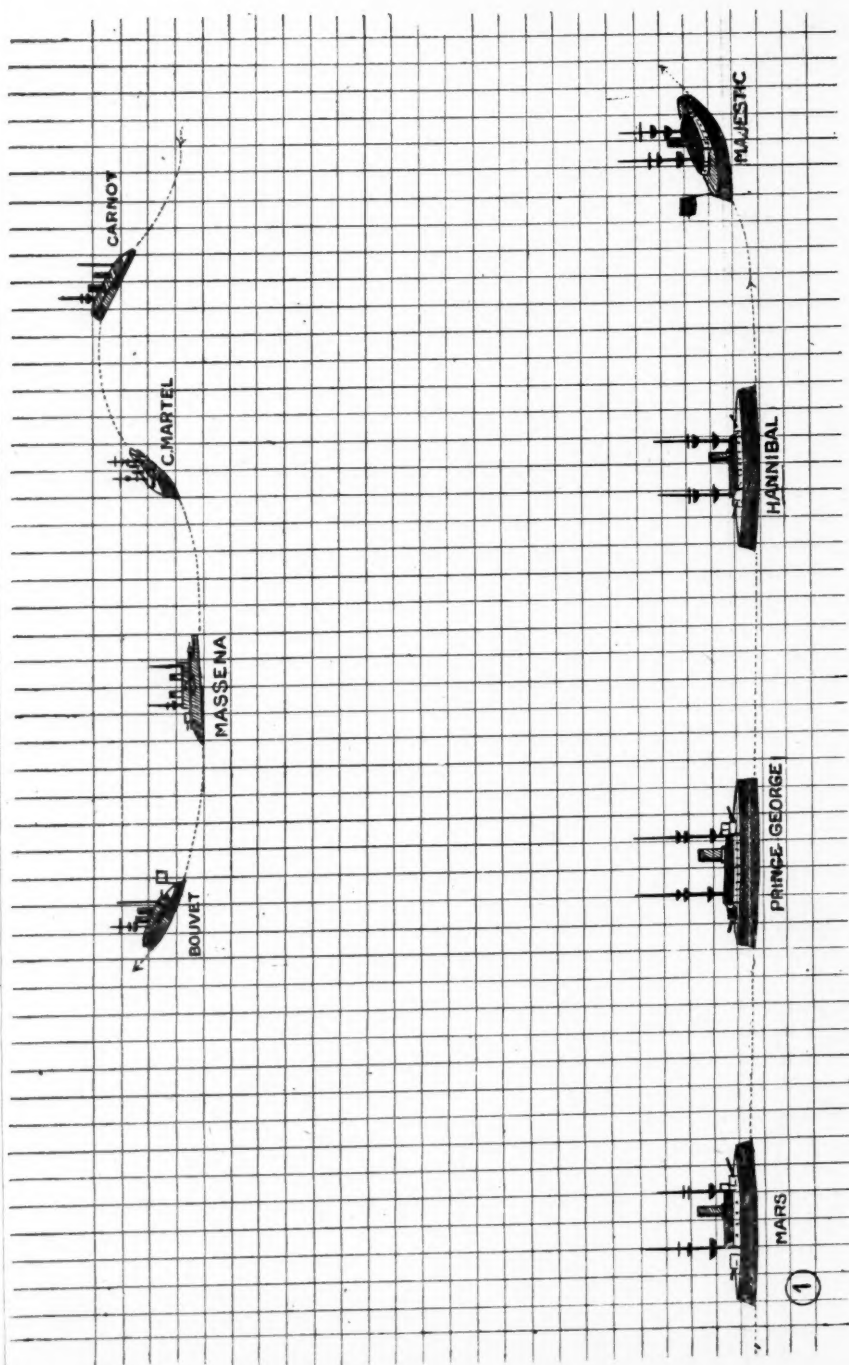
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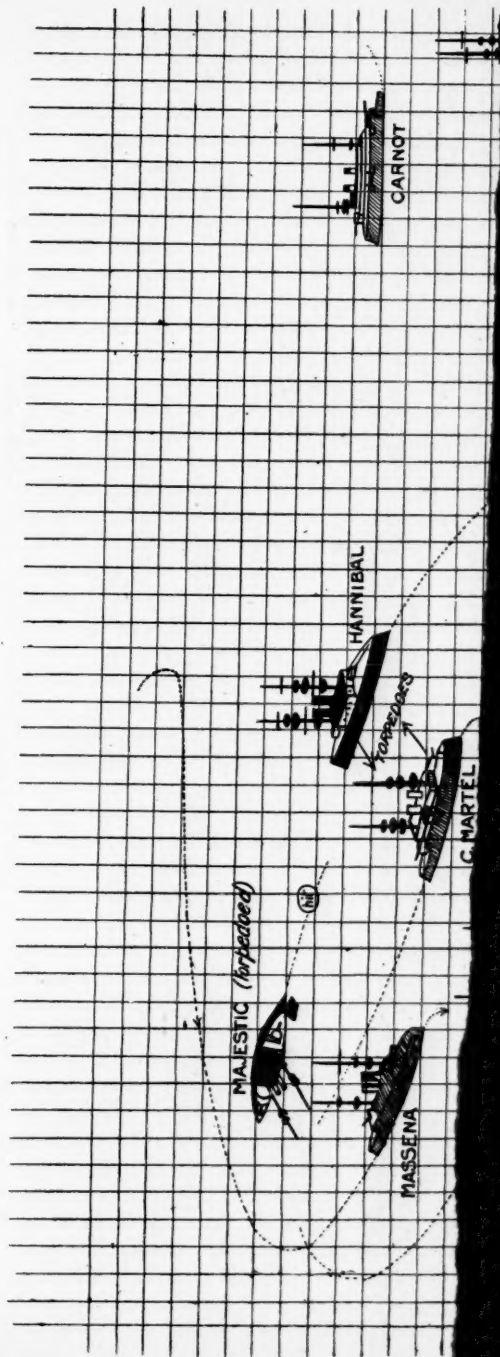
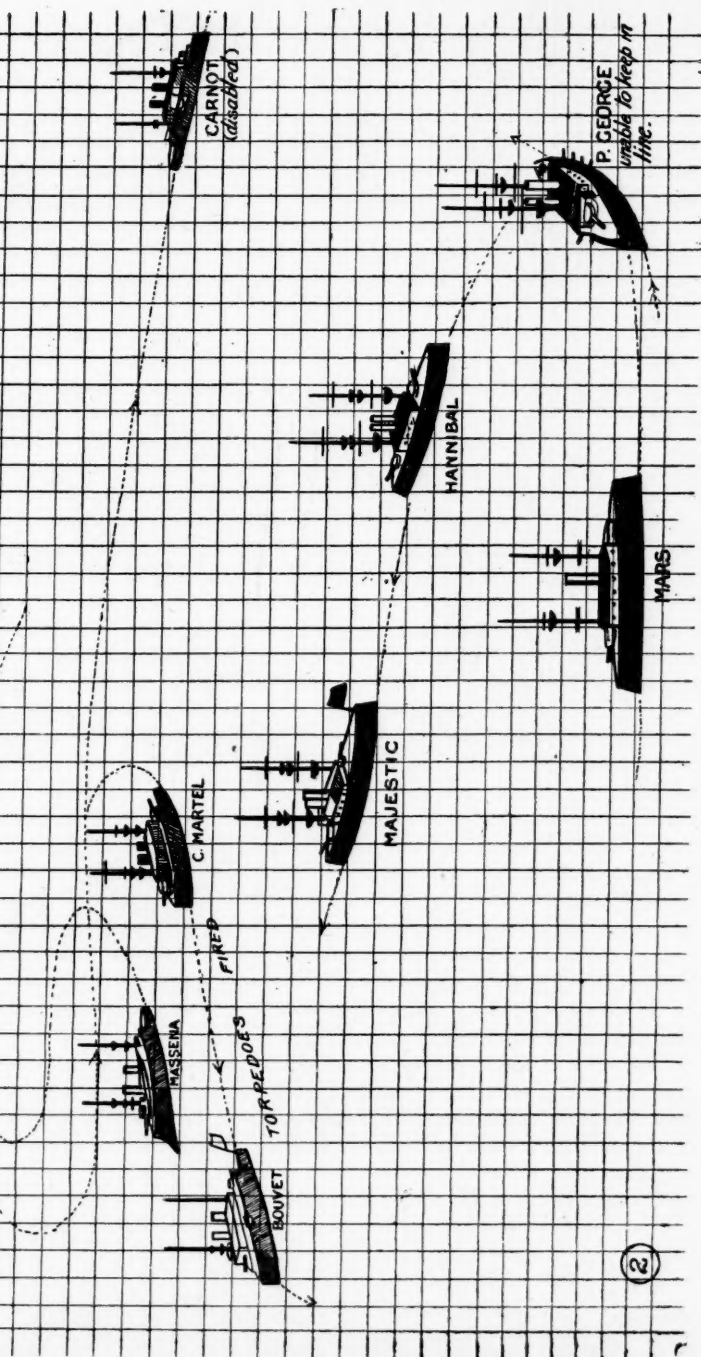
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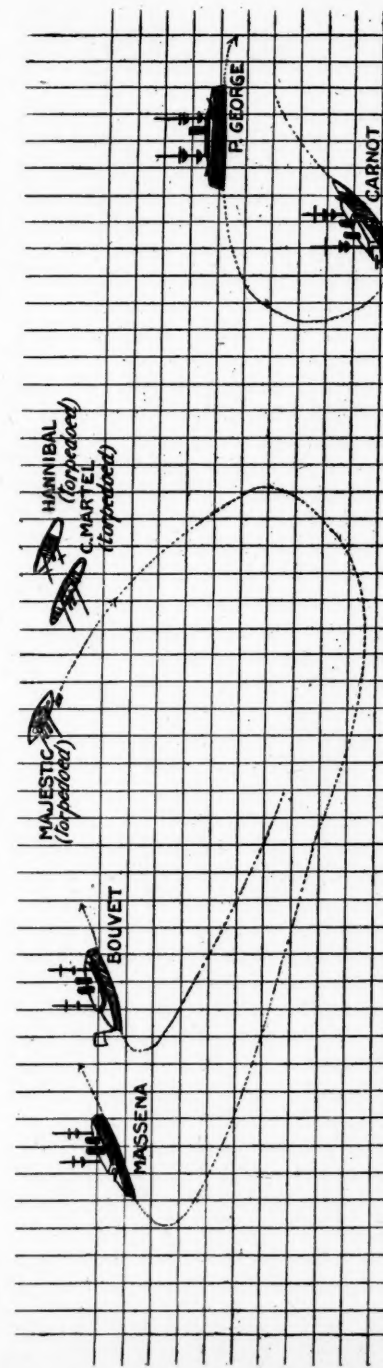
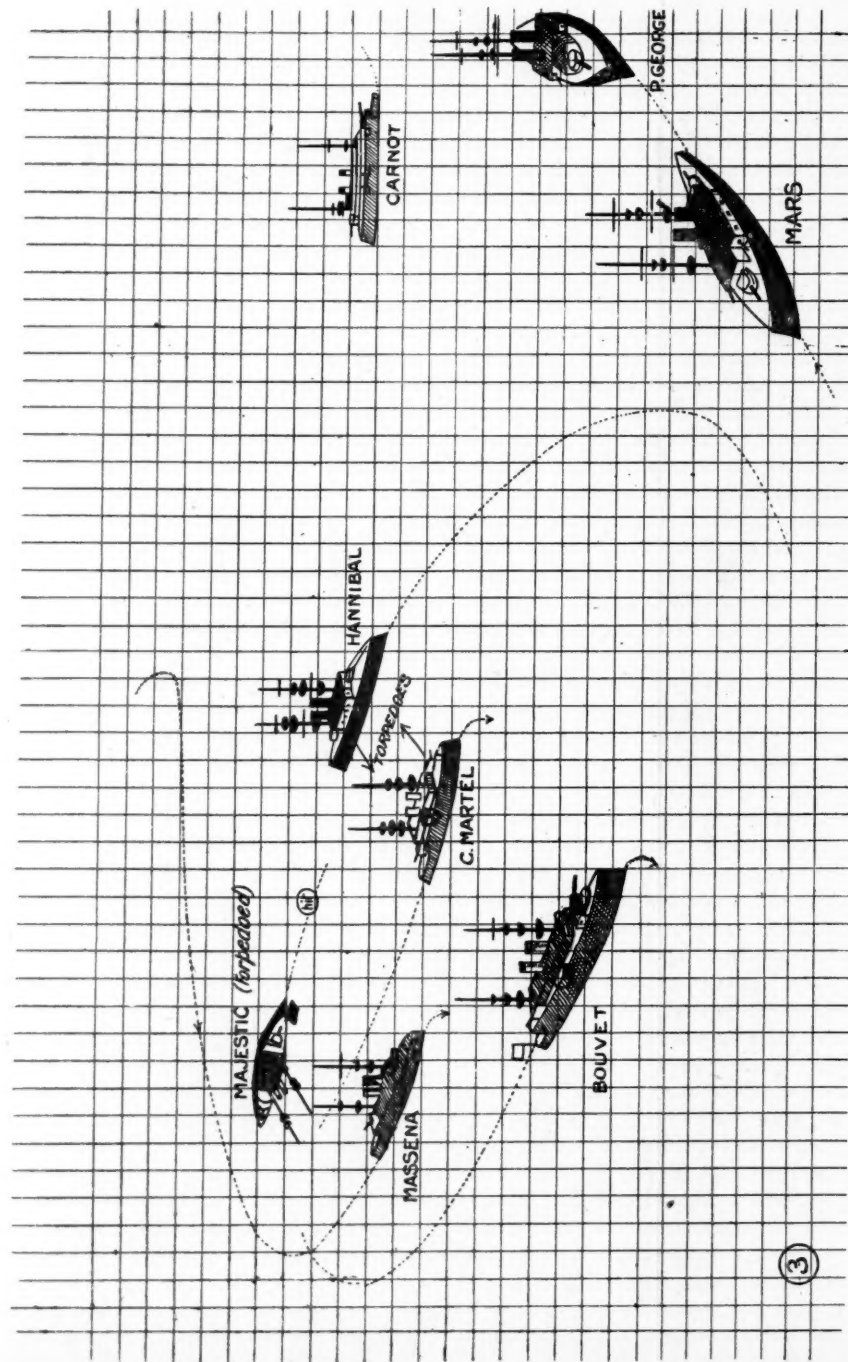
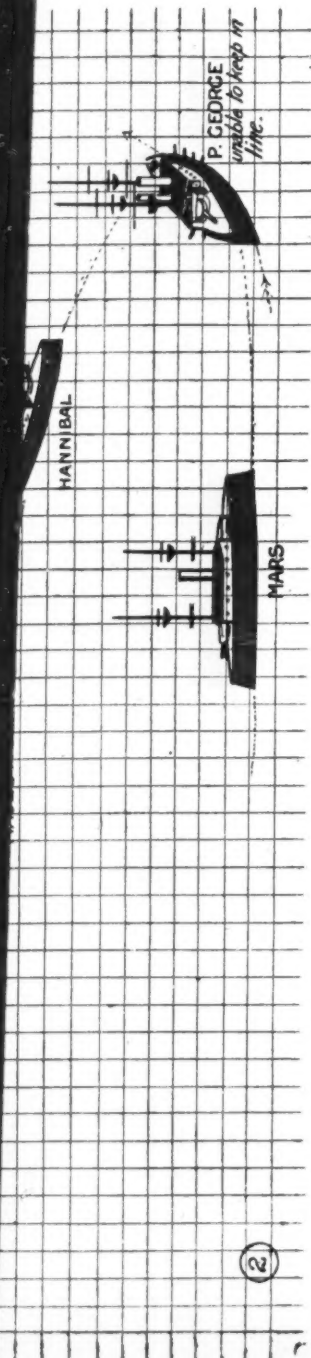
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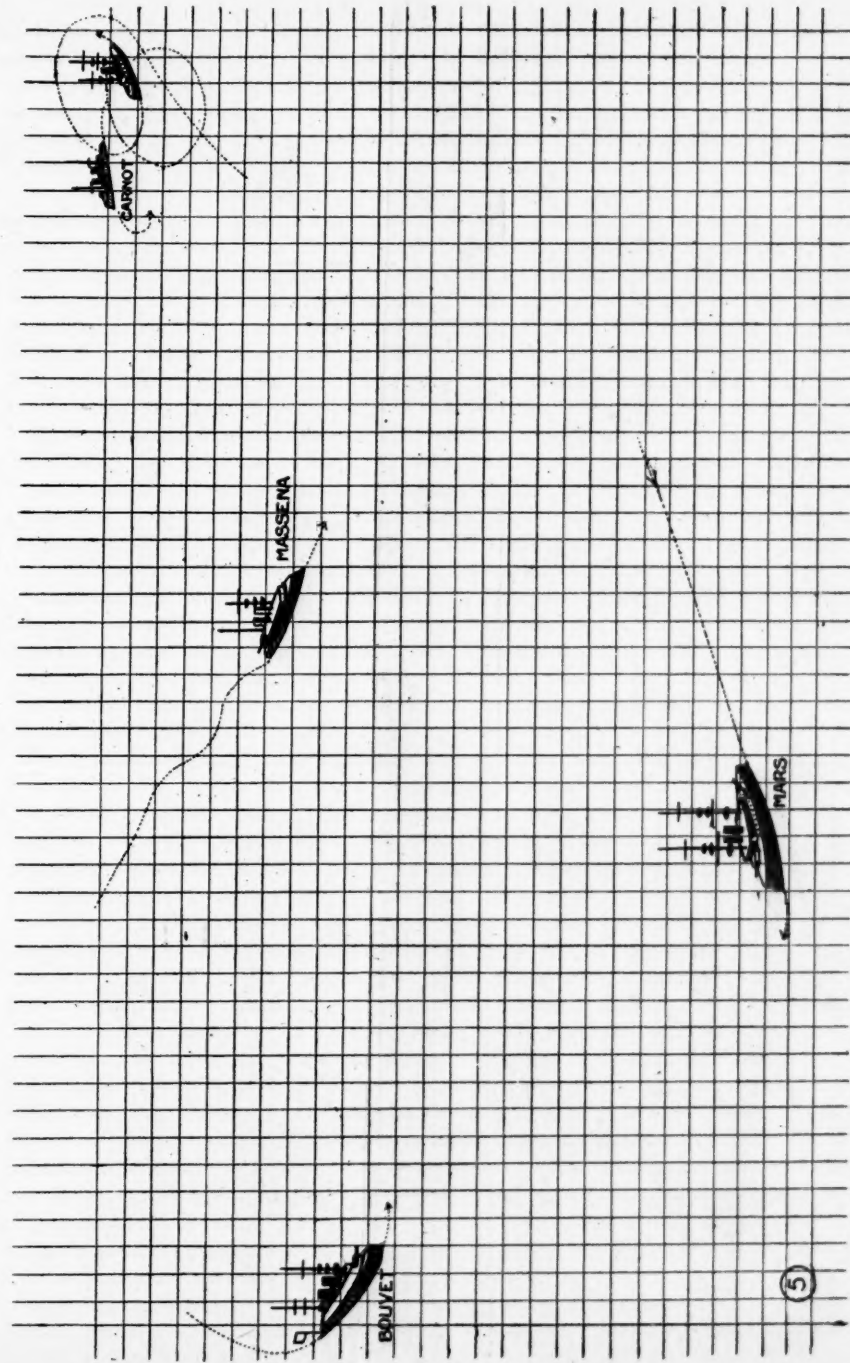
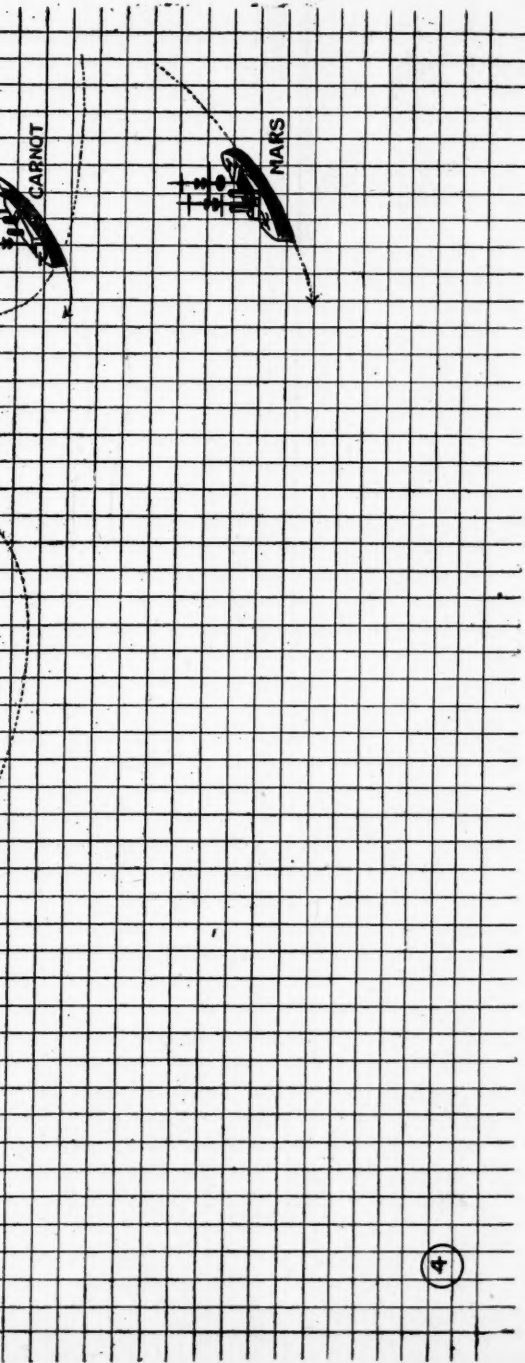
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Diagrams shewing different phases of War Game played on board H.M.S. "Mars."

the subject who have played the game, most of them think the tactical utility may be considerable, especially in the use of the gun, but for the ram and torpedo it is not likely to teach us much. I think the opinion of the last lecture was that the strategical utility was not great. I myself think that one defect of the game is that the models are too complicated, and I do not like bringing in all these little things, such as the turning of the turrets. It makes the captain think of everything for his ship. If the captain in action has to give detailed orders as to the handling of the guns and training of the torpedo-tubes, I think you will find that his time for that sort of thing is more limited, and probably the captain who will do best in action is the captain who devotes the best attention to the handling of the ship, working on broad general principles to enable his guns and torpedoes to be used, but leaving the details as to the training of the turrets and torpedoes to the officers who are in special charge of them. I will not make any further remarks, but I thank Mr. Jane on behalf of all of us for giving us the lecture to-day.

Mr. F. T. JANE, in reply, said :—One little point has been raised about turning the turrets. People say, "It is very easy to move a little ship about on a board, but that is very different to handling a real ship." So the idea is that if you clog a man up with a lot of things to make him think about, you get him in the mental condition that he would be in in action. In addition to that, what in reality would happen in about a minute in war could not occur under four or five minutes in the game, and the player, therefore, gets *an undue opportunity to think*. So everything that we can do is done to compel a man to decide instantaneously about everything, as he would have to do when he is fighting in an action. I think that is the only remark I have to make, except to return my thanks to Captain Lowry, for the remarks he has made.

HOW IS FIRE SUPERIORITY TO BE ATTAINED IN THE INFANTRY ATTACK?

By *Lieut.-General von ROHNE.*

[From the *Militär-Wochenblatt*, Berlin, No. 71 of 1899.]

Translated by F. H. A. BEX, Librarian, Prince Consort's Library,
Aldershot.

ALTHOUGH there still exists a great divergence of opinion as to the method of carrying out the infantry attack, all are in perfect agreement on one point, viz., the necessity of fire superiority for success. Personally I would go so far as to maintain that victory is virtually in the grasp of him who commands fire superiority, and that the question of the infantry attack practically narrows itself down to the query, "How is fire superiority to be attained?"

It admits of no doubt that, moral and material forces being equal, the attacker is placed in a position of far greater difficulty than the defender. The attacking line must necessarily, in order to reach its goal, momentarily suspend fire during the periods of successive moves. Only in the most favourable moments of the fire period does it offer a target of only the size of that presented by the defence, but whilst in movement undoubtedly a much larger one. Skilful use of ground may affect this latter factor slightly, but not to any appreciable extent.

Odds being evenly balanced, theory must perforce award fire superiority to the defender, and is logically bound to attach certain conditions to the mere possibility of a successful attack. Such conditions are superior armament and musketry training, the co-operation of artillery and last, but not least, numerical superiority. It is not intended to maintain that the latter is absolutely indispensable to attach victory to the standards of the attacker, but in its absence one may only under quite exceptional circumstances reckon on unqualified success. To quote an example, such specially favourable conditions did prevail during the second half of the campaign of 1870-71, when the Germans were fighting against totally undisciplined and untrained men. For such fortunate contingencies, for which one is truly thankful and which are promptly exploited, guiding rules need not be formulated, but science must start from the standpoint of the duel between opponents of equal mettle.

During the 1866 campaign in Bohemia, the Prussian infantry gained many brilliant victories, even against a numerically stronger opponent, although its path to victory had not been prepared by the co-operation of

artillery. Here superior armament was such an important factor that the infantry could afford to act without the assistance of artillery, and, relying on its own resources alone, was still certain of success. This advantage of superior armament consisted not so much in the faster rate of the Prussian infantry fire as in the facility for loading the needle-gun in any position—lying down, for instance—whilst the Austrian muzzle-loader could only be loaded standing; and a man in that position offered a target twice as large as that presented by a man lying down.¹

In the Franco-German war the better weapon was in the hands of the French infantry, but the superiority—solely ballistic—was not nearly so significant as that of the needle-gun over the Austrian muzzle-loader, for to make matters equal the German artillery *matériel* was far superior to that of the French. The opposing batteries were, as a rule, driven from the field or silenced after a comparatively short engagement, when, unmolested by hostile fire, the German guns could be employed upon the task of preparing the point selected for the main attack. Wherever the German infantry knew how to wait for the effects of artillery fire, victory like a ripe fruit invariably dropped into their lap, in spite of the superior French rifle.

Since technical skill has been so successfully occupied in the improvement of weapons and the trade of the world has been opened to the sale of its products, the time when one could speculate on similar advantages of superior armament has passed irrevocably by. Hence science must take up the question of how infantry alone, unsupported by artillery, is to execute the attack, as artillery does not necessarily always form an adjunct to the smaller fighting bodies.

This leaves us only the consideration of superior musketry training and of overwhelming numbers. Great improvements in shooting have been made in all Armies, but this by itself dwindles in importance when considered in full light. A unit may show excellent results in individual practices, but when less zeal has been applied to judging distance, its performances in the field will certainly fall below those of another unit whose merit in *both* branches is only moderate. Examples without number prove this clearly in time of peace. Not once only, but repeatedly, have cavalry armed with the carbine—the inferior weapon—obtained a greater number of hits than well-trained infantry, distance and sighting being identical. Both made the same error in judging their distance, which caused results to be lowered in both cases, considerably in the case of good shooting troops, and in a less degree in that of the more indifferent shots. I guard myself specially against underrating the value of musketry training. Thorough musketry training is above all a factor in the soldier's education calculated to cultivate confidence in himself and in his weapon, and it imposes on him the conviction that good aiming and a steady pressure of the trigger alone suffice to ensure a hit. The fact of this not being true²

¹ Compare Supplement 11, *Militär Wochenblatt* of 1898, "Measurements by means of photography of the vulnerable surface exposed by the skirmisher," p. 518.

² When judging distance practice has been neglected.—TRANSLATOR.

matters little. A soldier so trained will never—at least, we fondly hope so—fire an entirely unaimed shot in battle.

Numerical superiority is still the main thing, quite as much as when, in the days of Napoleon, the God of Battles favoured the big battalions. It rests with the higher leaders to take steps to enable this superiority to be brought to bear when the decisive day is at hand, whereas the responsibility for its correct employment rests on the shoulders of the tactician, and ballistics may also be permitted to utter a weighty word of advice in this connection.

I have demonstrated in earlier writings¹ that the percentage of losses suffered by a target given breadth of front (the exposed individual surface being equal throughout) depends entirely upon the average number of hits per metre of front. Of two opposing lines of equal length, one of which is double the strength of the other—rate of firing and ability to hit being, of course, supposed to be equal—the weaker one will suffer exactly the same proportion of loss, *i.e.*, double the percentage of the stronger, because double the number of cartridges have been fired against it. Hence it follows that, other things being equal, the stronger side must undoubtedly establish superiority of fire,² and it is therefore in the interest of the defender when once he commences firing on the attacker to make his firing line at once as strong as circumstances will permit. He would otherwise be compelled to reinforce, to make good losses in the firing line, under the enemy's fire, and would thereby incur still greater loss, unless exceptional conditions of ground favoured the advance of reinforcements completely under cover. He would also surrender the advantage enjoyed over the attacker of offering only low targets. Whenever the defender acts in the manner suggested, it will be impossible for the attacker to make his superior numbers tell in any frontal attack. Supposing he wished to cover his front more densely than the defender's—one man to each pace of front—the men would only interfere with each other with consequent additional losses (taken literally), without raising the effect of their own fire. The defender will sometimes find it feasible to establish several lines in terrace fashion one above the other, as, for instance, in the occupation of villages or of abruptly sloping heights, whereas the attacker never has a similar

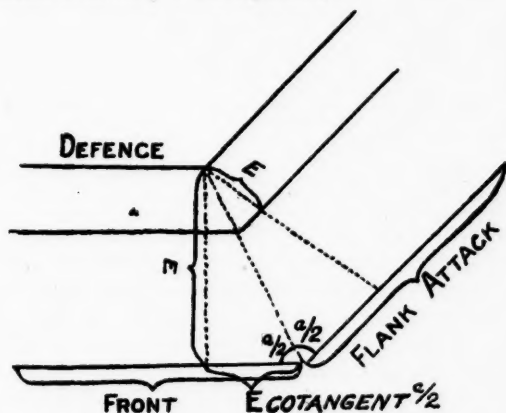
¹ Rohne, "Musketry Instruction for the Infantry," Sec. 28.

² The following may serve to make clear the extreme difficulty of counter-acting numerical superiority by superior skill. Let us imagine a skirmishing line A composed of 100 rifles, whose ability to hit the target is double that of an opposing line B of 200 rifles, density of formation being equal. By doubled hitting power I mean that the individual shot in line A makes in a given time double the number of hits made by an individual in line B. Thus the proportion of hitting power would at the opening of the fight be as 1:1. Let us say that each line has eventually made 30 hits. Taking "Musketry Instruction for the Infantry" (appendix 14) for a basis, line A would have 26 men disabled as against 28 men in line B. But the loss of 26 men would be more acutely felt by A than the loss of 28 men by B, the former now disposing of only 74 rifles to the 172 of the latter. A having double the hitting power of B, the proportion, originally as 1:1, would now be as 148:172, or as 1:1.16. From this onward fire superiority will incline toward the stronger line in a rapidly increasing ratio.

chance. Against a strongly occupied position liable only to frontal attack the attacker must surely bleed to death. Although his rearward lines may afford him the means of covering the losses of the firing line, it must be remembered that the defender also is not solely dependent on his single line of skirmishers, but that he likewise has reserves, perhaps not quite so numerous, at his disposal.

It is for this reason that the Drill Regulations for the Infantry, Part II., Secs. 69 to 71, declare a purely frontal attack to be impracticable. By extending his front the attacker can certainly bring an increased number of rifles into action, but the defender may reply by employing similar tactics.

The only way in which it is possible to make numerical superiority really felt lies in the combination of the frontal with a flank, or enveloping attack. Both in 1866 and 1870-71 did the Prussian (respectively German) troops favour the enveloping attack, and employed it with generally good results. The principal advantages which make it, whenever successful, so effective are to be found in the fact of its threatening the enemy's line of retreat. I will not here dwell on this point, but will confine myself to the consideration of its bearing on fire effect, and shall endeavour to demonstrate that it is in fact the one safe way and means of arriving at fire superiority.



The enveloping attack facilitates the deployment of a firing line greatly exceeding the extent of that of the opponent, the attacking front increasing in width in comparison with that of the defence :—

- a. The smaller the angle formed by the flank attack with the original front,
- b. the greater the distance from the enemy.

If E (see diagram) denotes the distance from the enemy, a the angle of the flank attack with the proper front (respectively the angle of the enemy's newly formed flank with his original front), the measure by which the attacker's fire front exceeds that of the defender will equal $2 E$

cotangent $a/2$. If, for instance, a equals 90° , the attacker's front is prolonged beyond that of the defender :—

At the distance of 200 metres by 400 metres				
"	"	500	"	1000
"	"	1000	"	2000
"	"	2000	"	4000

When, as in the diagram, the angle is one of 135° (the defender's flank in that case being thrown back at an angle of only 45°) the front of the attack will only be increased at :—

200 metres by 208 metres			
500	"	520	"
1000	"	1041	"
2000	"	2082	"

Directing the attack upon the enemy's salient point, the proportion of the attacker's to the defender's front will furnish a standard of the amount of fire superiority that may be expected to result. This proportion depends in a great measure on the breadth of front against which the main attack is to be launched. If it is intended, for instance, when the forces engaged are small, to force an entry into the hostile position over a space 100 metres wide, the length of fire front which can be directed upon the point will be at an angle of 90° (135°) at the distance of :—

200 metres	$100+400=500$	metres	$(100+208=308)$	metres
500	"	$100+1000=1100$	"	$(100+520=620)$
800	"	$100+1600=1700$	"	$(100+832=932)$
1000	"	$100+2000=2100$	"	$(100+1041=1141)$
2000	"	$100+4000=4100$	"	$(100+2082=2182)$

Hence it follows that the length of the attacker's firing line, which at the distance of 200 metres is 5 (3) times that of the defender, is at a distance of 2,000 metres 41 (22) times that length.

If, on the other hand, the point of entry is to be 1,000 metres wide, the attacker's length of fire front will be at the distance of :—

200 metres	$1000+400=1400$	(resp. $1000+208=1208$)	metres
500	"	$1000+1000=2000$	(" $1000+520=1520$)
800	"	$1000+1600=2600$	(" $1000+832=1832$)
1000	"	$1000+2000=3000$	(" $1000+1041=2041$)
2000	"	$1000+4000=5000$	(" $1000+2082=3082$)

The odds in favour of the attack, which with the small front at the distance of 200 metres were as 5 (3) : 1, have dropped with the attack on the wider front to 1.4 (1.2) ; at a distance of 2,000 metres from 41 (22) to 5 (3).

It is remarkable how the length of the fire front—therewith fire superiority—increases with the distance from the enemy. This proves the high importance of artillery co-operation in an enveloping attack, because of the diminution of fire superiority at the very distances at which infantry fire assumes decisive effect (below 800 metres).

However, yet another factor appears which tends to promote fire superiority in an enveloping attack. In a frontal attack projectiles passing over the opponent's firing line only threaten danger to the supports in rear; but in the flanking attack a second target offers itself to shots aimed too high. The attacker concentrates a vast number of bullets on a narrow space, whilst the defender, on the contrary, must distribute a smaller number over a wide range.

Should the attack succeed in making the effect of the enveloping movement surprisingly rapid, the chances of success are considerably improved; and if the defender is not timely in a position to form an angle with his second line, his front is exposed to a flanking fire, when to the already mentioned advantages to the attack must be added the further fact of individual firers in the lying-down position offering a much larger target to flanking than to frontal fire. The vulnerable surface of a marksman exposed to fire from a flank is, according to Supplement 11, *Militär-Wochenblatt* of 1898, twice as great as that of a man being fired at from the front.

Another advantage accompanying the attack against a salient angle lies in the fact of the attacker's front constantly contracting with the progress of the attack, thereby reducing the necessity of reinforcing to replace the casualties which, in a frontal attack, is necessary in a much greater measure. And at the very moment of reinforcing the fighting line the casualties are most numerous, because a double target is presented to the enemy, one of them being a target of the full height of the body.

Two not unimportant lessons for the defence may be deduced from these studies. One is in the selection and occupation of positions to pay attention to strong flank defences—strengthened if necessary by artificial means—in order to reduce the attacker's chances of success to a minimum. The other is to omit taking up points of support in advance of the main position, unless they are situated in such close proximity to the latter that in turning them the attacker must expose himself to a very heavy flanking fire from the main position.

I am aware that I have in these studies brought forward no single new point. But it appears to me to be important to show that tactical rules rest upon the laws of ballistics. I ask that the figures quoted may only be regarded as examples which can claim only relative, not absolute, significance.

AN INTRODUCTION TO THE STUDY OF NAVAL TACTICS.

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Translated from the *Revue Maritime* by Fleet-Engineer T. J. HADDY, R.N.

NAVAL tactics may be defined as the art of disposing fleets for combat, but it is essential to give to all the terms of this definition the most extended meaning they will bear. The art of disposing fleets for battle is not limited to the formations and evolutions which precede or accompany the different phases of a naval action; it comprises also the whole series of studies and measures, having for object the disposition of the fighting elements in each of the units of which these are composed. These previous arrangements will enable us to obtain at the decisive moment the best possible utilisation of all the arms which contribute to final success, quite as much, and perhaps more, than any of the tactical combinations proper of the last moment. The rôle of the tactician commences, therefore, long before the struggle. It is exercised really during times of peace, during the preparation of the plans of war-ships, their armaments, and their union into squadrons. To him it belongs in the first place to welcome or to reject the *perfectionnements* of every kind which modern science may be pleased to offer daily in relation to engines of warfare for naval service. However perfect a new arm may be, or however ingenious its mechanism, its employment ought to be governed by its value under the special conditions of its utility for service on board ship, that is to say, in a heavy sea and under the fire of the enemy. He should also endeavour to assemble judiciously the instruments of battle at his disposal, create types of ships appropriate to the end at which he aims, and form them into harmonious groups of which all the elements are completed one by the other, and lend each other mutual support. This important task, the true preparation for all tactics, is not the work only of supreme authority; each commanding officer must contribute to the same, not only when called upon to supervise the work of completing a new ship, but also when in a commissioned ship he has to co-ordinate and utilise arrangements already existing, to bring out their best qualities, to discover and correct, as far as possible, their defects. During the first part of his career the officer must study the theory and practice of all the branches of which nautical science is composed, branches so diverse and complete in themselves, that to render real service he must become

a specialist in one of them. But the moment he commands even the most feeble unit, he ceases to be either gunner, torpedoist, or rifleman, in order that he may be a specialist only of this complete arm, the ship of war. Leaving henceforward to others the duty of ensuring the due preparation of the different machines, he gives himself to the study of their simultaneous and judicious employment in the hour of battle, that is to say, their tactical employment. Each of the arrangements which he may make to this end, especially in the time of first commissioning, will exercise its influence on the future result in action, when the collective power of the ship has to be manifested. To be at his best in this rôle of preparation, the commander must not rest satisfied with the experience he has gained while serving in the junior grades; most frequently the ship which he has now to make fit for battle, has a very distant resemblance to those in which he has already served. It is not one of those latter that he can usefully take as a comparative term. The ideal type which to his mind responds to the actual necessities of maritime war, alone should inspire the resolution he takes and the opinions which guide him. It is necessary for him then to have this formation of ideas, a theory, or, if the word is preferred, a doctrine, from which is evolved for him a clear conception of what squadrons and war-ships ought to be. It is this doctrine which we purpose to study in the following pages, without seeking to place it above the inestimable teachings of experience, and with the single ambition to formulate some of the general principles on which rest, by reason of the rapid and radical changes in *matériel*, the constitution and construction of ships and fleets.

FIRST PART.

Maritime War: General Notes on War.—The logical basis of all conceptions of military order rests for the officer in a wholesome appreciation of the true character and importance of the mission with which he is entrusted. War is not only an unfortunate necessity of our times, a remains of ancient barbarism from which we suffer, waiting for the time when the wisdom of our race will agree to avoid it. Such a view is incomplete, and does not suffice to give to him who commands that serene and inflexible sense of the duty he has to fulfil. The officer must be convinced that war is quite otherwise than an unfortunate and accidental necessity; that it is in reality one of the laws, and perhaps the highest of those, which dominate the development of societies. It is the decisive and indispensable phase of this vital competition which is in exercise to-day, and legitimately, amongst the nations, after having been exercised between individuals, families, clans, and provinces. In this incessant and also profitable conflict of ideas and interests, recourse to force as the last and supreme argument can never be abolished whilst distinct nationalities exist, for none of them has the right to abandon the patrimony of its intellectual traditions and acquired wealth, or to renounce without constraint its own individual existence. The last unification of races and classes to which the unconscious effort of humanity tends is only compatible with a superior degree of civilisation and morals, from which, as

yet, we are very far distant. Universal peace will be established one day, but only by the final victory and exclusive predominance of the most noble, the most intelligent, and the strongest race. The end of war is to insure and affirm, in view of this far-off selection, the development of the national life, and its resistance to, or the assimilation of, rival nationalities.

The Peculiar Characteristics of Modern Warfare.—Although war has been the fruitful means of drawing together the march of the ages and uniting one by one all the elements of which the fatherland is made up, its true rôle has often been overlooked. This is particularly noticeable at the present time, because the progress of the human mind, while making war less frequent, has at the same time made it more deadly. The prolonged hostilities of former days have given place to short and decisive encounters, which diplomacy, while knowing them to be inevitable, endeavours to stop, and in which clearly personal ambition and spite no longer play a part, but the public interests and often the very existence of the nation.

Everyone naturally realises that these exceptional circumstances call for the arousing of all their energies, the ordinary course of life is stopped, business ceases, and agriculture itself deserted, the whole nation armed makes for the frontier, calling in and swallowing up for its purpose all the resources of the country; such are the peculiar and striking features of the warfare of to-day. Preparation for war consists, generally speaking, in training the greatest possible number of able-bodied men and of collecting the vast quantity of stores which will be necessary for their action, and of studying the methods of attack and defence.

There is, however, another point of view which we must not pass over in silence. It is not enough for a nation, in order to predominate, to be the most intelligent or the strongest; she must above all be the noblest, that is to say, the most moral and the most imbued with the sense of her duties. The most deadly engines of war are powerless in the hands of men bereft of this spirit, and against which nothing can prevail. The first and most efficacious preparation for war is to raise the moral level of the population. War ought not only to be a great evidence of intelligence and strength, but above all should testify to the moral superiority of the people.

Concerning the Rôle and Importance of Maritime Frontiers.—Frontiers which are the natural or conventional boundaries of countries may be regarded in some respects as the organs of life outside the country and of its relations with other peoples. They serve in time of peace to regulate the exchange of the various products of the soil and of industry, and in time of war as the impenetrable ramparts of the country.

The part played by sea frontiers is, from these two points of view, very different from that played by frontiers on land. By means of the latter, the country is in fact in immediate contact with its neighbours on the continent. It is to a certain extent tributary to them, from a commercial point of view, since its trade can only be established with them, or by their intervention. It endeavours to export to them the overflow of its

productions of all kinds and must in return submit to the importation of the goods, ideas, and even the language of its rival neighbours. This continuous work of assimilation tends to increase the development of the means of communication, and in consequence to lead rapidly to an acute stage in the vital competition, which exists between two countries separated by a common frontier.

If war breaks out, the attack or defence of the frontier is the initial and dominant factor of the hostilities which must of necessity have for the scene of action the territory of one or the other of the adjacent nations. The struggle thus entered upon may finally result in a modification of the frontier by the annexation of neighbouring provinces to the victor, or even at the crushing and complete assimilation of the vanquished : war between two nations whose territories limit each other is therefore of the most menacing and terrible nature and should be prepared for with the most careful deliberation.

Quite another affair is the problem imposed on the defenders of maritime frontier, by which force intercourse is maintained with all nations. The sea is the common route open to all, which leads to all ports, and from this it follows that maritime commerce necessarily has a much greater importance than that of overland trade, and is the source of all power and wealth to the nation having the advantage which the sea frontier gives. From a military point of view, the violation of maritime frontiers is really an operation of the secondary order, as it presupposes the destruction of the sea-going squadron of the country, its first line of defence, or that they have been reduced to impotence. It is, besides, an operation exclusively maritime, confined to the coast, but it may well be followed by an invasion of the country by the landing of an armed force. War between two countries which have not a common frontier will naturally commence at sea, and be followed by an attack on the frontier. It may also have this character when two bordering nations have a sea outlet which is common to both. Such is the case with France and Italy. Both of them are backed by the massive heights of the Alps on the land side, and have their neighbouring coasts reciprocally prolonged to form the western basin of the Mediterranean. Their commercial relations are carried on more easily by sea than by the mountain defiles, and from this results a conflict of interests which should logically lead them to dispute the supremacy on this common sea. On the contrary, war between two countries having a common land frontier and coasts washed by the waters of different seas, such as are France and Germany, must be before all a continental war. It would be an error all the same in this case to minimise the importance of the maritime frontier. Each of the two countries engaged will employ, as we have seen, the whole of the resources at its command. Now these resources are limited, and it is permitted to suppose that neither of the armed Powers in presence of each other, supported by a series of fortifications and entrenchments, will be able to succeed at once in finishing the war by obtaining a decisive victory. It will be, then, of the greatest importance to each of the two Powers to be able to appeal to neutral States and to obtain supplies of

whatever it may need, by means of its sea frontier. The sea will have, in consequence, the double mission of guaranteeing, by an effective blockade of the coasts by the strongest sea Power, free access to all its own ports, whilst it has all access to those of its adversary and all communication by sea with neutral Powers. It will be well to notice here the particularly favourable position of France from a geographical point of view. By the Mediterranean and Algeria she commands Africa, and by the Suez Canal, which is her work, she extends her influence to the Far East. By these ocean coasts she has a view of the new world, and her fleets radiating from these two maritime frontiers may be compared to two arms stretching towards the universal commercial riches of the globe. By her land frontier, extending from the north to the south of Europe, she can and should exercise a legitimate influence on the Continent; but she must not forget that maritime commerce alone can furnish her with the means of exercising that influence. It is an energetic and wisely exercised colonial policy that will procure the resources of which she has need in order to sustain the inevitable claims of her Continental policy.

Aim of Maritime War.—The preceding considerations are sufficient to bring into relief the important part the Navy has to play in time of war and to determine the object which, under all circumstances, it should endeavour to realise. Whether its power is exercised against a neighbouring nation or a people separated by sea, whether its object be the defence of its own ports and dependencies, or to safeguard foreign interests, the naval power of a great country will always propose as its goal the control of the sea in the region determined—that is to say, to maintain in this region the liberty of its communications and to interrupt those of the enemy. It is with a view to satisfying this double objective that fleets and ships of war should be constructed and disposed.

Restricted Field of Action of Modern Fleets.—Let us maintain, in the first place, that modern fleets are impotent to realise this objective everywhere, and to take indifferently as their theatre of operations the vicinity of the coasts, the seas of Europe, or those more distant, as was done by the sailing fleets of the last century. These found wind everywhere, which was their motive power, could obtain victuals and necessaries for their crews in all countries, and possessed the incontestable tactical advantage of a range of action almost unlimited. The characteristic of modern fleets is, on the contrary, to unite with great military power a very limited range of action. On the one hand, the propelling machinery, powerful engines, and capacious boilers occupy the largest part of their hulls; on the other hand, the weight of artillery, armour, and various kinds of mechanism constitute the most important part in the factor of expense. The capacity of the coal bunkers, that is to say, the radius of action, cannot be augmented without detriment to the speed of the ship or her military strength. Moreover, combustibles justly considered as contraband of war, cannot be supplied by neutrals. The tactician can only exact for modern fleets that their range of action shall be that which is strictly indispensable for the mission devolving upon them, and is forced to design in practice fleets of different natures and compositions, according to the special rôle assigned

to them. This obligation leads us to pass rapidly in review the different operations of maritime war, from the defence of the coasts, the minimum of naval action to which a nation having a frontier can be restricted, to the action of squadrons on the open sea, which is the highest manifestation of her power.

Coast Defence.—The organisation of coast defence is not of capital importance for a nation whose fleets possess an incontestable superiority over those of her rivals. England, for example, can with reason consider the bulwarks of her ships the real ramparts of her sea frontier. On the contrary, when a part of the littoral is situated in the immediate neighbourhood and under the constant menace of a superior maritime Power, preparation of her defences of every nature becomes a necessity of the first order. Such is the case with our littoral in the Channel. The principal object of the defence of the coast is to oppose the landing of an enemy's forces, and the sea squadron should in these circumstances support this object with all its strength. The secondary object is to resist all attempts of the enemy's fleet to effect a temporary occupation of any point on the coast, destruction of semaphore stations, guard houses, and the bombardment and imposition of ransom payments on her ports. In any case the defence has opposed to it a floating enemy, and this, as we have already remarked, makes it exclusively a maritime question. The troops which accompany the assailing fleet or convoy are inactive: they take the offensive only after they are landed, that is, after the final check to the coast defence. The work of the coast defence is then at an end, and it becomes a question of territorial defence with which the land forces have the charge and responsibility. The work of the Navy is confined in reality to the defence of the littoral, or coast line. This defence is principally assured by batteries and forts constructed in the neighbourhood of the most accessible points of the coast. These works having to deal with ships, ought in principle to be provided with artillery similar to theirs, and with sufficient power to pierce their armour protection. The methods of firing even should in a certain sense resemble that employed on board ship against a movable target. The coast forts are then veritable ships on land, and their sea front may be very well compared to the battery of the ship. This comparison is rigorously true when speaking of batteries which are often furnished with armoured turrets similar to those of ships afloat. High batteries and mortar batteries might also be provided with naval guns without any inconvenience. When we consider theoretically a duel between a battleship and a coast battery, we are led to conclude that the advantage will always remain with the latter. The battery, can, in fact indefinitely increase the thickness of its parapets and of its steel defences. By the employment of disappearing gun mountings and smokeless powder it can be rendered invisible from the sea, and it can also maintain a very considerable reserve of ammunition. The ship, on the contrary, is always visible; it has only a limited protection, and the number of shots it can fire is restricted. From this condition of affairs it would appear that the defence of the coast might be assured by the forts only, if in addition to the

above they are completed by an efficient obstruction for the entrances of the harbour by means of lines of torpedoes or boom defences. As it is practically impossible, however, to construct defensive works at all vulnerable points, it becomes necessary to extend and complete the fortress defences by means of a defensive fleet, the units of which are in their turn veritable forts on the sea, having the quality which is wanting in land defences—that of mobility. This defensive fleet, which will always operate near the coast and can be constantly revictualled, need only have a very limited range of action. It may be composed of ships of different types, monitors, rams, gun-vessels, all fitted to carry a powerful armament and to fight, if need be, by impact. It would combine its action with that of the torpedo-boats, the latter by preference acting by night, and by surprise attacks, and taking refuge by day under the protection of the forts or defence ships. Finally, these mobile columns could be employed in preventing access to the shore for landing parties by boats, or by the lighter ships of the enemy. The dissimilar elements of this organisation must have a continued action under the direction of a single authority, which can only be that of the Navy. It would be useless to consider at greater length the action of the defence, our object only being to point out the place in it which the ships of the coast-defence fleet should occupy.

Squadrons in Action.—The organisation of the maritime frontier defences can only be the prologue to the naval action of a great Power, of which the territories, countries, and the flag itself are scattered and engaged at all points of the globe. To abandon these interests; to refuse to protect and maintain those commercial routes, which are the exterior radii of the national life, would be equivalent even in the case of a purely Continental war to an immediate and irremediable defeat. It is vain to object that in this case the fate of the country would be decided on the land frontier, and any naval action, however brilliant it may be, would have no effect on the final issue of the war. We believe this opinion to be quite untenable. We have already shown the necessity imposed on each of the belligerents to maintain not only the security, but free access to its coasts. The possibility of being able to replenish at sea, and to prevent your adversary from doing so, may greatly contribute to final success. France in particular has the greatest interest in obtaining as soon as possible the supremacy in the seas adjoining her territory. As regards Germany, she ought to be able to close to this power the passages to the Channel and the North Sea. On the other side she occupies the two shores of the western basin of the Mediterranean, and could never consent to see the communications between Algiers and Marseilles interrupted, and allow the enemy to separate one of her provinces from the remainder of her territory. Beyond doubt the first object to pursue, is to prevent the invasion of the country by the enemy's troops; but nothing can prove that invasion could not be effected by way of the sea. In the case where the land frontier is formed by a natural barrier, such as the chain of the Alps, an enemy which is master of the sea would in preference seek an easy and open passage for its forces. It is of the highest importance therefore to prevent the aggressor obtaining access to the waters in

the vicinity of the coasts. This result can only be obtained by a suitable extension of the coast defence. The torpedo-boats, as we shall see further on, are powerless to realise the object we have in view, and it will be the same in the case of all ships of extreme speed, but inferior in military strength to those of the enemy. If we demand of coast-guard ships the task of opposing the passage of the enemy's squadrons, we should then give them the speed and range of action which they are lacking, construct ships of high freeboard, add to them cruisers and swift vedette-ships, indispensable to prepare and complete them for action, form them, in a word, into a sea-going squadron. Also whatever we may do, the necessity appears evident that we should maintain in the North and in the South two fleets, which would be the highest expression of the naval power of the country, and whose mission would be to acquire the supremacy of the sea in the neighbourhood of our territory over the squadrons of our eventual rivals. These squadrons would play in relation to the maritime frontier the same rôle as the Army in the land frontier, with this difference, whereas the latter at the commencement of hostilities would be massed behind the frontier, the former would be in front and beyond it in face of the enemy. We have not to examine here how the battle between the squadrons would be carried out. The two adversaries, both convinced of the necessity of obtaining command of the sea, might seek to meet each other at the outbreak of hostilities; one might perhaps, on the contrary, force the enemy to accept battle by engaging in one of these secondary operations which logically ought not to be undertaken till after the squadrons have been engaged.

We will limit ourselves to the simple statement of the fact that this encounter is inevitable, and that even in a Continental war it will exercise a considerable influence, and may be decisive. It is hardly necessary to say that in case of war against a maritime Power the fleet would always play a preponderant rôle. It would be an error to believe, for example, that a naval Power such as England could be seriously shaken by a so-called commercial war, directed solely against her commerce. The English squadrons, left incontestably masters of our territorial waters, would blockade our ports and prevent our cruisers from putting to sea. If some of them should succeed in getting out it would soon happen, after a more or less extended career, that they would be captured for want of coals by the cruisers of the enemy. The squadron or fleet action, in view of maintaining free access to our ports, would be therefore in this case the necessary prologue to the commercial war. We would remark here that up to the present we have reserved the name of "squadron" to define powerful fleets designed to meet in our own waters their European rivals. The maritime war in distant seas would necessitate the employment of ships which, in order to have a large range of action, must necessarily possess somewhat less military strength.

The Attack on the Enemy's Coasts.—This attack can only be an episode of the battle of the fleets; but in principle it ought to succeed it, and only become possible after victory. If in particular we consider the principal end which we can have in view on the enemy's littoral—the landing of an

army corps—we may affirm that this operation cannot be carried out except under the protection of a fleet having control of the sea. The necessity of having to protect a convoy of transports with troops and material puts this fleet at a great disadvantage if it has to contend at the same time against a force intact, and nearly equal to it in power. It will have also the important mission of keeping off the enemy's isolated cruisers, to engage the coast-defence ships and other mobile defences of the littoral, and if need be to destroy the defensive works on the coast at the point chosen for the disembarkment. All these operations are, as for the defence of the coast, as a whole exclusively maritime, since the transported troops cannot enter into line till they have been landed. The blockade of naval and commercial ports too cannot be undertaken except by a squadron which has previously reduced the rival fleet to inaction. The restricted field of action of modern fleets, in fact, requires that a secondary base be established near the point blockaded where the blockading squadrons can replenish in detail, and which can be connected with the principal base by transports passing to and fro on a secured route. The forcing of passages is an operation which a fleet would sometimes have an interest in undertaking in order to attack the defence works from the rear. In principle it may be stated that the direct attack on a military port by day is not to be recommended. A squadron operating alone could not engage the forts and force the entry to a fortified port of the first rank without exposing itself to great loss, and seeing many of its units either lost or placed out of action, and thus compromise the supremacy which it has with so much difficulty gained over the enemy. It is only in a case where the forts may be invested on the land side by an army of occupation that it could with advantage make a favourable attack from the sea. It could then combine its movements with those of the army, of which it would form, so to speak, one of the wings, and lend the aid of its powerful artillery. The bombardment of undefended towns is not to be included amongst the operations directed against the enemy's littoral. A squadron could without doubt exact from a commercial port, giving a sufficient time for the purpose, the money, combustibles, and victuals of which it may be in want. But to wantonly burn and destroy an undefended town would be an act without influence on the issue of the struggle, and be contrary to those higher principles which we have assumed throughout this study. We should not fire on disarmed troops, we should cease fire when the enemy has struck his flag, *à fortiori* should we respect the persons and property of non-combatants except when in overwhelming force; resistance alone calls for and justifies the use of arms.

War against Commerce.—The reflections above apply in part to the enterprises undertaken against the maritime commerce of the enemy, and which are assuredly amongst the means best calculated to injure her naval power. These attacks complete the action of the fleets by realising one of the two objects in all naval war—that of interrupting the communications of the adversary. In violating this national interdiction, in putting to sea under the cover and protection of their national flag, the trading

ships participate to a certain extent in the action of the belligerents. They would not, therefore, be respected in the same way as the private property of non-combatants. It must be always understood that the object of war against the trade routes is the capture, and not the destruction, of the prize. It is only when, by force of circumstances, the ship captured will be an embarrassment or danger to the captor that it should be sunk, after having, of course, placed the crew in safety. This obligation leads us to the conclusion that light and small ships, particularly torpedo-boats, are unsuitable for action against trade routes, as they have not sufficient men to man the prizes, nor sufficient accommodation for their crews if obliged to destroy them. The trade route ships should have great displacement, large range of action, and very high speed. Their rôle is, before everything else, to interrupt the enemy's communication by sea.

Conclusion.—This brief consideration of the different necessities for maritime war which we have here presented will show the immense importance of the battle squadron properly so called. It is the fleet, which in enabling us to obtain the command of the sea, will assure the defences of the coast and the metropolis, and render it possible for us to attack the enemy's coasts and trade routes. To-day, as in the past, actions between the line of battle-ships will alone decide the maritime destiny of the nation. This truth has not been shaken by the radical changes which have taken place in the qualities of ships of war, and which have succeeded in making them to a great extent independent of the caprice of the elements, bearing in themselves the principle of their movements and all the elements of their power.

SECOND PART.

The Battle-ship: Definition.—A war-ship, the instrument of maritime war, should be, let us repeat, constructed and fitted with a view to realising the double object which is proposed: to maintain the liberty of communication by sea, and to interrupt those of the enemy. Her rôle is to act in the open sea and to be before all capable of remaining there and moving with safety. We, therefore, refuse to give the name of battle-ship to any vessel, whatever her size and armament, which bad weather will oblige to put into port, or to reduce speed, sooner than mercantile-ships of the same tonnage. This quality of keeping the sea, that we may call navigability, is the first and essential quality that we must demand of the constructor before any military installation. We have seen besides that naval action has for its aim the command of the sea, and in destroying the ships of war or capturing the merchantmen of the adversary. It is only exceptionally directed against the defences of the coast. If the artillery of the ships may be sometimes used against the latter, the military arrangements as a whole should be conceived with a view to engaging battle-ships. The ship of war can, it appears, then be defined in a general way as a sea-going ship fitted for combat against the enemy's fleet.

Naval and Military Powers.—This definition comprises two parts, which correspond to the two terms constituting the battle-ship, the ship proper and the armament, the floating platform and the fortress. The first is endowed with nautical qualities which permit her to reach any given point, and the second possesses the necessary military qualities for battle. The nautical qualities—navigability, range of action, speed, handiness—not only affect navigation, they have besides considerable importance from a tactical point of view. They contribute in a large measure to the military efficiency of the ship, and for this reason we think it advisable to designate them by the general expression of “nautical power” in opposition to the “military power,” which comprises the whole offensive and defensive arrangements of the ship. It is essential never to confound these two terms of the power of the battle-ship. We can now indicate plainly the difference which distinguishes them in the tactical point of view by the following rules, the evidence for which requires no demonstration:—1. The nautical power of a squadron is exactly equal to the nautical power of those of its units which possess the least; on the contrary, its military power is the sum of the military powers of all the ships of which it is composed. It is clear that a collection of ships possessing, for example, different speeds can only move simultaneously at the speed of the slowest one, whilst every ship provided with an armament and protection adds to the offensive and defensive power of the whole. 2. The nautical power of a ship of given tonnage can only be augmented to the detriment of her military power and *vice versâ*, each of them, in fact, corresponds to her displacement, which is the whole fraction disposable at the price. Before drawing any conclusion from these axioms, it will be well to examine briefly in the logical order of their importance each of the elements which constitute the opposing qualifications of the battle-ship.

Navigability.—The first of these, navigability, comprises many factors, of which without contradiction, the most important is stability. We must demand that the battle-ship shall be *uncapsisable*, not only by wind or sea, but also when through injury any one of her water-tight compartments has been flooded. If this essential condition is not fulfilled, divisions into compartments instead of being a safeguard will become a danger to the ship. Stability of form, that which we have in view, may be somewhat restricted by the necessity of obtaining stability of platform for precision of fire for the guns. It is to the constructor we must look to establish under his own responsibility the due relation between these two terms of stability, and to fix the metacentric height which in conjunction with special form of hull will under all conditions give the complete security required. We would renounce for our part an armament, or any military installation whatever, which would compromise itself by undue increase in the weight of the upper works, and consequent lessening of the metacentric height. It is not sufficient only to secure the stability of the ship, it is just as necessary that she should be seaworthy in a heavy sea. It is an error to think that the whole of the upper works of the ship can be used for military purposes apart from the general

theory of flotation. The ship should, in the first place, be able to sustain her fighting speed in all ordinary weather against a moderately heavy sea, not without experiencing of course a certain falling off in her speed, but without suffering from it any serious injury, and that she should still be able to use her guns with effect. This essential quality of the ship not only demands solidity, but also suitable form in the forepart exposed to the shock of the waves. It ought never to be sacrificed, for example, by reducing the freeboard forward in the desire to obtain a right-ahead fire for the bow guns. On the broadside the height of the waves and the inclination produced by rolling reduce the area which is available for the artillery. The line which, taking account of these two factors, is always out of the water is the true limit of the hull; the part of the hull above the water-line cannot be considered as completely above water. All installations comprised between these two limits, that defined as the true limit of the hull and the water-line, which project beyond the ship's side, such as sponsons, shoots, etc., often exposed to the blows of the sea, produce shocks and spray which injuriously effect the aim of the guns. This effect would be still more accentuated if the side of the ship were of tumble-home form. We require from the constructor before all else that the hull of a battle-ship should be clear and straight to the gunwale. Lastly, that the ship be habitable and that the crew can find sufficient breathing space in all parts where they are obliged to live. The ventilation of the compartments, principally those where the temperature is high, should be assured, not only under ordinary conditions, but also during action; it is not admissible to close ports and scuttles and expose the crew to the danger of suffocation. We may add that the ventilation of the compartments must be obtained not only by supply of fresh air, but it is very important to provide in each of them for the exhaustion of the foul air. We also consider that habitability is not complete without an upper deck where the men can at least take a few steps in the open air.

Range of Action.—We have designedly placed range of action immediately after navigability. If the first is the essential quality for all sea-going ships, range of action is the first determining factor in the ship of war. It is by this that she is classed, on principle, in one of the fleets that we consider necessary for the national defence—the home squadron coast defence, or the divisions for distant seas. Range of action is generally defined as the greatest distance that a ship can cover with her own resources at an economical speed, but from a military point of view it is preferable to compare them by the distances covered at high speed. We shall then define the tactical range of action as the distance which can be covered at the “fighting speed,” and we shall see later in what sense this is understood. We have already had occasion to show, and the course of this study will still emphasise the fact, that the range of action can only be augmented to the detriment of the other qualities of the ship. It is, then, essential to fix at once the minimum range of action that the ship should possess in order to fulfil the object for which she is designed. It is to the tactician that belongs the task of fixing this first quality, which the constructor must not reduce in any case,

nor under any pretext. The range of action depends on the quantity of coals which can be carried in the bunkers; it is important not to include in this quantity the coals used for auxiliary purposes on board; this latter, which we may call coals for consumption, should rather be assimilated to victuals and stores. The supplies for the above, including fresh water, should be, like the range of action, fixed for the constructor according to the different types enumerated above. The necessity for replenishing and revictualling should, at least, extend for as long a time as the range of action, but should never be confounded with coals for propulsion, which principally affect the displacement of the ship. It is not without interest to remark with regard to this, in time of war unsuitable displacements in battle-ships will cause them to lose part of their tactical value by reducing the range of action immediately obtainable. We shall have something to say later on about the artillery and ammunition supply, which only affect the military power of the ship.

Speed.—Of all the elements of nautical power, speed is, without contradiction, that which contributes most directly to the military effect of the ship. We must guard ourselves against including it amongst the factors of military power of which it is only a useful auxiliary. The ship which possesses superiority in speed can attack or avoid her adversary at will; she can maintain the distance most favourable to her, and thus choose the nature of action she wishes. She is in a situation similar to that of the ship which, in old times, succeeded in taking advantage of the wind. But, as formerly, this advantage only becomes efficient if the ship possess at the same time an armament superior, or, at least, equal to that of her rival. If she is manifestly inferior in strength she can use her superior speed to escape action, and fly from her foe. The speed which can thus usefully contribute to the military action of the ship of war has nothing in common with that which is obtained by means of forced draught and special conditions at the full-power trial of the engines. The ship would never try again to reach this speed, for she could not do it without exposing herself to injuries which she has the greatest interest in avoiding. Tactical speed, or, in other words, "fighting speed," is that which can be sustained indefinitely under natural draught without fatiguing either the *personnel* or the engines, the crew being at their stations for action. This last condition implies the possibility of supplying the coals from the bunkers to the stokeholds without interfering with the working of the guns or the ammunition; this "speed for action" corresponds with a determinate power of the engines and revolutions of the screw; it is that which would be adopted in general under all circumstances of war, having in reserve the power to increase her speed in case of need. Away from districts frequented by the enemy, it will often be to the advantage of the ship to proceed at economical speed, thus permitting her to obtain the most extended range of action. There exists, of course, a fixed relation between range of action and speed. These two elements together give to the ship all her nautical power.

Handiness.—In order to enumerate the different factors of nautical power, it remains to say a few words on the turning qualities of the battle-ship.

At the period when she possessed but one screw the diameter of her turning circle exercised in certain cases a considerable influence on her military action ; it determined, in fact, a circular zone behind her where the enemy found himself in a favourable position for an attack at close quarters by the ram or torpedo. The battle-ship at present has less interest in reducing her turning circle, since she possesses at least two engines which permit her to turn more easily. She can always, however, still gain a marked advantage by the possibility of turning quickly without altering the speed of her engines. The constructor should then endeavour to procure her this advantage, taking care that the inclination produced by this turning movement may not be harmful to the use of her artillery. We must demand besides that the efficiency of all the steering gear mechanism, wheels, tiller, steering engines, etc., should be guaranteed, and assured to the same degree as that which we require on a weapon of war, on which we shall have to speak further on. We may, in fact, say of all motor machines, and generally of all the vital organism of the ship, that it is on the whole in truth a gigantic weapon which the captain manipulates by means of the propellers and the tiller.

Offensive and Defensive Powers.—The military power of the ship is composed of distinct parts, inseparable from one another : offensive power and defensive power. The first comprises all arms designed to act against the adversary ; and the second, all arrangements which permit of their action under the fire of the enemy. The qualities which we demand of a weapon of war are the following : In the first place, the weapon should be able to be handled with safety ; it is indispensable that the crew should know that, unless from gross carelessness, they have nothing to fear from the arms that they use. They should also be simple—that is to say, the mechanism should be put in action in a simple manner. The employment of modern arms no doubt requires special knowledge, principally for mounting and adjusting fittings, but the weapon should not be at the mercy of an indispensable man alone capable of working it and who may be wanting at the moment of action. It is important, in the third place, that this mechanism be strong ; whatever their complication, they should be as far as possible free from risk or damage by negligence or unskilfulness. It is necessary that we should be able to rely absolutely on the good action of a weapon of war at the precise moment when it is required. It should be efficient, that is to say, it should do the greatest possible injury to the enemy ; this last condition is evidently the most important, but it can only be realised after the three others. However terrible may be the effect of an engine of war, we should reject its employment if its management appears dangerous, complicated, or uncertain ; and, in conclusion, we repeat that the arms should be at the same time safe, simple, strong, and efficient. To these, which are general qualities, a fifth condition must be added peculiar to arms destined to be employed on board ship : the working and efficiency of these latter should be as little as possible influenced by the movements of the ship. The offensive weapons of the battle-ship are three in number—the gun, the ram, and the torpedo ; we leave on one side portable arms, the rifle, the cutlass, and the revolver—which, although very

useful in special cases, cannot be considered as the arms of the ship. These latter, designed to fight a floating enemy, have to fulfil two objects : either to sink the adversary by acting against her under water, or to put her out of action by acting against her essential organs and her *personnel*, by the destruction of her upper works. Inversely, the defensive has to assure on the one hand, the flotability of the ship, and, on the other hand, the protection of her different mechanism and of her *personnel*. Both these terms of military power of the ship are completed the one by the other.

It is not possible to rely for defence on a courageous and vigorous attack ; in the sea where these exist in natural obstacle or shelter, we must affirm in presence of the progress made in modern artillery that the best guarantee for the offensive lies in an efficient protection.

Artillery.—The gun is the weapon *par excellence* of the ship of war. Naval battles have always been, and still are, artillery duels. The ram and the torpedo only play an occasional part, for the fleet which possesses the advantage in speed can easily avoid attack by these weapons. The artillery, on the contrary, is the arm for all distances, and is sufficient to produce the two effects which we require of offensive arms—*i.e.*, to sink the adversary, or put her out of action. Its *rôle* is to penetrate and to destroy, and to those two ends two kinds of projectiles are employed—armour-piercing and explosive shells. Both act by percussion, for the incessant variations of distance between the opponents only permit of the use of time fuses under special circumstances, such as shrapnel and bursting shell against light ships at a limited range. We may remark here that we endeavour to give to armour-piercing shells a certain destructive effect after perforation by means of a small explosive charge. In the same way we seek to obtain the explosion of the other shells only after the penetration of the unarmoured sides of the ship. We approach, then, in these two cases to the type of projectile which can produce both effects successively and completely. The obstacles against which naval artillery has to act in the case of her floating target are three in number. The first consists of the ports of the ship, turrets, and water-line, which have received the maximum of protection, and are covered with the thickest armour. We must employ against these obstacles the heaviest guns, that is, those with the greatest ballistic power. This ballistic power, which is more a result of velocity than of weight of projectile, is not necessarily proportional to the calibre or weight of the gun. We should endeavour to realise this result by the employment of lighter metal with more resisting power. It is none the less true that in the actual state of metallurgical progress the most powerful artillery has necessarily considerable weight, and, in consequence, the number of heavy guns which can be carried is limited. Their employment necessitates hydraulic and electrical complications, and the manœuvring of them is slow. Besides this, the supply of ammunition must be considerable ; the shots from the heavy guns are then of necessity fewer, and should be carefully aimed during the action. It would be bad tactics to direct them against obstacles of the second category, comprising the parts of the ship of least resistance, or provided with very

thin armour. These parts would be more efficiently attacked by guns of less calibre, the quick fire of which would permit a larger weight of projectiles being directed against it than from the heavy guns in the same time. The parts of the ship devoid of all protection, the thin plates of the superstructure, and the hulls of light ships, would be pierced or destroyed by the projectiles of light Q.F. guns, and which would act also against the *personnel* not under protection.

The division of the artillery on board into three groups—heavy, medium, and light—is, as we see, required by the nature of the obstacles to which they are opposed, but it must be noted that the rôle of the heavy gun is always predominant. Its fire may be decisive if the ship is struck at the water-line, and is almost always effective whatever be the part of the ship struck. One might even employ sometimes against the upper works explosive shells of large calibre, the ranges of which would be considerable; the arrangements concerning the number and position of the heavy guns constitute, therefore, the most important factor of offensive power. The number being limited by the necessity of developing the other elements of power should force us to obtain the maximum efficiency of these guns, by giving the most extended field of fire possible. Theoretically, the battle-ships should only carry a single gun of large calibre; the military power of a squadron could be increased in this case to the necessary strength by increasing the number of its units, but this arrangement would constitute, on the one hand, wasteful expenditure of the country's resources, and, on the other hand, it would not be possible to place this single piece at a point on the ship commanding an all-round fire. We are, then, led to give a battle-ship at least two heavy guns, placed in the middle line, one forward and the other aft, and having on each side of this line the most extended field of fire possible. These two positions are in truth the only ones suitable for the heavy artillery, and if it is considered necessary to increase the number of heavy guns to four for ships of large displacement, it would be advantageous to place at each of these points two guns contained in the same turrets. This arrangement always possesses two defects: the first is, that a single lucky shot might disable both guns at once; but the saving of weight realised allows of the maximum protection being given to the guns thus coupled, and reduces as much as possible this defect. In the second place, the bow and stern guns by their cross fire on each broadside leave a triangular zone which most of their projectiles can cover. The arrangement of the four guns lozenge fashion, that is to say, one forward, one aft, and one on each broadside, does not, it is true, possess these defects, and theoretically permits of the fire of three guns in each of the four principal directions; but this advantage is purely imaginary, for the fire of the guns situated at the centre and on the broadside cannot be obtained except by a re-entering and defective form of upper work, which exposes the forward and after parts of the ship to serious injury from the flare of the guns. We reject also on principle the use of flare plates of thin steel, which can easily be destroyed by the Q.F. guns, and dangerously increases the dimensions

of the target offered to the enemy. In reality and in practice, the lozenge arrangement only permits us to use one gun right ahead or right astern, two on the bow or the quarter, and three on the broadside; one of the four pieces is always idle, in the case of a single target. The arrangement in couples forward and aft, on the contrary, permits us to use two guns right ahead and right astern, and four on the broadside. It thus gives superior offensive power with considerably less weight, since only two turrets are required instead of four, and to this arrangement we must logically give the preference.

We have obtained for the heavy artillery the maximum of ballistic power by reducing to a minimum the number of its units. We should demand, on the contrary, that the guns of medium calibre should be as numerous and handy as possible, preserving the ballistic power necessary to act efficiently against the obstacles which they have to destroy. We may place these guns in any part of the ship where their action is not interfered with by the fire of the heavy artillery. In the twin system, which we have already advocated, the medium guns can be placed with advantage in the central part of the ship, those guns nearest the extremities could fire right ahead and right astern on each side of the turrets for the heavy guns. We believe this arrangement preferable to placing these guns of medium calibre on a higher platform. The difficulties that we find in the latter case in giving complete protection to their mountings, and the necessity of reducing the height of the battle-ship above water as much as possible, demand in our opinion, that all the heavy and medium artillery could be placed at the same level. The forward guns should be placed considerably higher above water than the after ones, so as to be always workable in a heavy sea. We thus preserve the whole of the highest parts of the superstructure for the light guns, of which the predominant quality is rapidity of fire. It is not necessary to place this artillery very high, as its principal object is to act against torpedo-boats, and in this case the fire should be made as *raking* as possible. The aim of the guns placed in the tops is necessarily very uncertain, not only by reason of the movements of the ship, but also on account of their height above water entailing a considerable angle of depression. These guns can only act usefully against the *personnel* on board ships not protected by the flying decks and bridges. It is doubtful if this object is sufficient to justify the employment of military masts, which serve as their supports, and which are liable to be carried away and destroyed during the action by explosive shells, and so become a serious danger to the ship. The masts of battle-ships should be fitted for signal purposes with the least possible surface as a target for projectiles. The efficiency of fire, apart from calibre, depends on the two factors correctness of aim and rapidity. Theoretically, rapidity of fire should only take the second place, but in practice the chances of hitting the enemy increase with the number of projectiles that it is possible to send against her during the time, generally very short, that she is in a favourable position for attack. There is, then, always the advisability to perfect the mechanism of the artillery so as to obtain the greatest possible

rapidity of fire; not forgetting that the ammunition passages and fittings must have the same qualities of simplicity, safety, and endurance as we require for the gun itself, and permit of as rapid a supply of ammunition as is its fire. We believe it to be a mistake to endeavour to solve the latter problem by the rapidity of movement of the ammunition carriage, which can be obtained only to the detriment of safety. The necessity of quick fire is rarely unforeseen, and can be provided for in this case by taking care to commence in good time, if the method of supply by our endless system of ammunition pockets be employed; the movement of the ammunition from the magazines to the guns is then slow and continuous. We can then very easily provide in the magazines a supply of ammunition equal to the demands of the gun. The rapid fire of medium calibre guns must be carried out with judgment. The tactical principle of firing on the enemy with the greatest possible activity directly he is within range cannot be applied in actions at sea. The adjustment of aim for very long ranges cannot be effected with any degree of certainty, and the limited supply of ammunition available would be exhausted in two or three hours under these conditions. Rapid fire, then, for medium guns should not be used until the range has been obtained with certainty, and at distances where the flatness of the trajectory would render a misjudgment of distance unimportant. In principle the heavy artillery should not come into action except at such a range as would ensure the penetration of the enemy's armour. This distance, which is calculated in advance, in the majority of cases, would also be favourable for the employment of the Q.F. guns of medium calibre, and may be considered the fighting range. The ship superior in speed and armament could impose this distance on her adversary by a circular duel, keeping out of the range of her torpedoes. It would, however, on the other hand, be generally better to present the bow to the enemy, and, if she accepts the challenge, to reserve the fire of the heavy guns and the quick-fire artillery for the moment of her passing the broadside, the most suitable nature of projectile to be employed having been determined beforehand. It may not be without interest to observe that with an arrangement of the artillery of all calibres in groups of two, armour-piercing projectiles and explosive shells could both be employed at the decisive moment. Without enlarging further on these considerations, we may state, in conclusion, that the principal qualities we require of artillery are rapidity of fire and flatness of trajectory. It follows that the artillery will not include mortars, a weapon with slow fire and curved trajectory, the employment of which demands a complete stability of platform, and an exact knowledge of the distances. They can be used with advantage for attacks on the coast defences and the bombardment of forts, but we may remark that the artillery on board can also be used for these special circumstances. We must treat briefly of the supply of ammunition, which represents to some extent the capacity of the military power of which the ship is capable. These supplies should be fixed by the highest authority, as the range of action for the military rôle for which the ship is designed. In no case should it be modified by the constructor, on whom it should be imposed

as an absolute condition. The magazines must be situated below the water-line and in the vicinity of the guns; and lastly, to simplify as far as possible, the ammunition service on board, it should be composed of three calibres only: one for the heavy guns, one for the medium, and one for the light guns.

The Ram and the Torpedo.—The object of the heavy artillery to penetrate and sink the ship by piercing the water-line, is continued below this by the ram and the torpedo, designed to act against the unprotected portions of the hull. The damage produced by the shock of these weapons is often sufficient to cause the loss of the adversary, but this efficiency is considerably lessened by the difficulties connected with their employment. It is, in general, only after a clever manœuvre, profiting by unforeseen circumstances in the fight, that a ship will find itself in a position to use the ram or to launch a torpedo. The ram, it is true, possesses those qualities of simplicity and energy which are the essentials of weapons of war. Action by shock practised from the highest antiquity, is made again possible in these days, in virtue of weight and speed of modern battle-ships, and will still remain for a long time one of the eventual factors of military power. It would be however a mistake to suppose that the ram, which is the weapon under the direct control of the captain of the ship, will be the object of exclusive attention during the action, and that the guns and torpedoes may be fired and controlled without him. Under all circumstances the manœuvring of the ship is governed by the necessity of obtaining the best possible utilisation of all her armament. It is the captain alone who is responsible for their combined action, and for deciding on the precise moment and the conditions for their employment. In the majority of cases it is a question solely of the artillery, and if the ram is sought to be employed its action can be prepared for and reinforced by means of the heavy guns and the torpedoes. The captain who proposes as his only object the use of the ram, runs the risk of having to report only the futility of his efforts. The facility of evolution with which the modern battle-ship is gifted, thanks to her twin screws, permits of her easily avoiding the direct attacks of her foe, unless she is disabled. Besides, the shock of ramming may prove to be as disastrous for the rammer as the rammed. We may question if the ram is not condemned to act only against a disabled and immovable enemy, or one obliged to hold on a straight course. Even in this case it must not be forgotten that any ship which so threatens another exposes herself to being stopped by a torpedo before attaining her object. Torpedo-tubes, suitably disposed forward and aft and on the broadside, play in this way a truly defensive rôle, by creating around the ship a zone which it would be dangerous to approach. The automobile torpedo may be compared to a ram which can act at a distance in all directions. This manner of looking at it better defines the tactical employment of the torpedo; it may be considered as a sort of submarine projectile. Although it holds the medium place between the ram and the heavy artillery, the slowness of its movement under water compared with the flight of the projectile in air, makes it difficult to regulate its aim. The two invariable factors principally to

be taken into account are the course and speed of the enemy. If possible, the torpedo should only be used at short distances, where it would have the greatest chances of success. The launching of the torpedo by means of submerged tubes makes the aim still more uncertain. We consider that it would often be advisable to have the tubes fixed, and to manœuvre the ship for their employment. It would, however, be of the greatest advantage, when the ship is no longer manageable through injury to her machinery, to have submerged tubes which could be trained on their object.

Flotability.—We pass now to the study of the defensive arrangements, which we define as those having for their main object the insuring the flotability of the ship which is attacked at the same time by heavy guns, the ram, and the torpedo. Against the first, up to now no better protection has been found than that given by a complete belt of armour at the water-line, extending from bow to stern. The minimum height of this belt is determined by the limits between which the line of flotation varies by rolling at sea, and by changes in draught, due to consumption of coals and stores. To the penetrating power of the projectiles this armour must offer a resistance which is not necessarily proportional to its weight and thickness. Progress in the manufacture of armour, as in guns, leads to the production of a metal more and more resistant in proportion to weight. It would be always advisable to extend the belt up to the level of the designed freeboard by diminishing thickness. When a belt does not exist, it is rather illusory to reckon on the protection afforded by an armoured deck to ensure the flotability of the ship. Useless, from this point of view, if placed above the water-line, it is dangerous if placed below it, for it fetters the action of the different means at our disposal for keeping the water out of the ship. The armour deck must, then, be arranged in turtle-back form, of which the central part is above the water-line, and the sides extend considerably below it. It must be observed that the inclined surfaces presented to the broadside in this case make them very vulnerable to the fire of shells charged with mélinite, of which the explosion produces its maximum effect in a direction perpendicular to the trajectory. Even so fitted, it should not be employed alone, from the risk of its becoming more dangerous to the stability of the ship than a deck fitted entirely above the water-line, as a single rent in the plating may be sufficient to cause the whole of one side of its surface to be immersed. It becomes a necessity to complete it by a line of cofferdams rising just above the level of the water-line, and by division into small compartments of all the parts of the ship above it. As no substance sufficiently light, incombustible, and effective has been discovered with which to fill the cofferdams, the system can only lessen the effect of projectiles to a certain extent by limiting the invasion of water to a few of the compartments on board, and the heel which this would cause might prove dangerous to the ship if no means were at hand to immediately avert it, and, above all, to pump out the compartments filled. The protection of the hull

below water from the attacks of the ram and the torpedo has to be altogether given up, and efforts are limited to reducing as much as possible their destructive effects. This is arrived at by the introduction of the double bottom and by multiplying the pumping arrangements. The subject, the study of which appears to be the exclusive domain of the engineer, should, from a military point of view, present those features of simplicity and safety in the fittings which we require of all mechanism which has to be manipulated in action. It is to this condition alone that they could efficiently contribute to the defensive power of the ship.

Protection.—Theoretically we might conceive it to be possible to secure completely the flotability of the battle-ship, but in making her insubmergeable we should only have solved one part of the problem of defence. The powerful artillery and modern explosives would not be long in paralysing her movements and reducing her to impotence, and it is therefore of the most evident necessity that, on the one hand, the organs of propulsion and manœuvring should be protected; and, on the other, the offensive power placed in the upper parts of the ship, that is, the artillery of all calibres.

The protection of the engines and the boilers is secured by the armoured belt and the protective deck. The last of debatable utility from the point of view of flotability, very efficiently protects all the interior organs of the hull from the direct shock of the projectiles; we are even being led to increase the protective effect of the armoured deck, by adding a *débris* deck, and a second horizontal steel deck, situated above the water-line; the space comprised between the two armoured decks can be filled by a system of cellular construction, and thus to almost completely isolate the hull from upper works; this isolation should never be so complete as to interfere with communication between the two parts of the ship, or with the ventilation of the lower compartments. As regards the protection of the artillery, the first condition in any system is that it be complete, that is to say, protects all the apparatus necessary for working the gun. It is vain to place one part behind armour and to leave another essential part exposed; if, for example, one of the pressure pipes of the hydraulic system is exposed directly to the fire of the enemy, the armour, however thick it may be, which protects the main body of the carriage is only cumbersome and useless. For the heavy guns situated necessarily, as we have seen, ahead and astern, the system of closed and movable turrets furnished with an armoured tube protecting the ammunition hoist is that which best realises complete protection. This system has, however some defects—it is difficult to control exactly enough the movement of the turrets and to perfectly secure the aim in direction. The shock of the projectiles also may damage the rotation-engines and so make the turret immovable; for these reasons we give the preference to barbette turrets, completed by strong movable cupolas; with the carriage in both cases it is necessary to carefully protect the central tube and the lower part of the turret when it does not rest directly on the protective deck. The thickness of the plates to be employed depends on the angle

at which they can be struck by the projectiles; the sloping and rounded form of the cupolas and shields allows of giving them a less thickness than that of the sides. The whole should be capable for the heavy guns of resisting armour-piercing projectiles of the largest calibre, for we must not forget that this heavy artillery is the principal if not the only *raison d'être* of the ship of the line, of which the offensive power rests entirely, or nearly so, in keeping this artillery intact. It is only when they are arranged for firing right ahead or right astern, as on board cruisers, that the guns of medium calibre can be advantageously placed in turrets or semi-turrets. In principle we should not seek to obtain right-ahead and right-astern fire for the broadside guns, nor even to give, them by means of sponsons projecting much from the ship's side, a very extensive field of fire. In the larger number of cases of chasing at sea, the ship chased has for her object to make for the naval force to which it belongs or a port of refuge. Her route must make of necessity an angle, with the ship chasing, which permits of the latter using her broadside guns. In the very rare case where the ship isolated and having a free field finds herself in a situation to give chase directly in the wake of her adversary, it is an advantage for her, without doubt, to be able to use as large a number of guns as possible. This advantage should always be considered the secondary one, and disappears before the necessity of preserving her course and speed in all weathers which is not possible with forms of forebody affording any hold for a shock of a heavy sea. We consider that all the broadside guns should be arranged in the battery behind armour capable of keeping out explosive projectiles, the protection of these guns should also be completed by a system of shields, domes, and bulkheads forming casemates, and designed to limit as much as possible the effects of explosive shells which may have penetrated to the interior of the ship. The light artillery may be advantageously arranged in groups on the upper deck protected by movable cupolas having a sufficient thickness to resist the projectiles of similar artillery. Finally, the definite adoption of Q.F. artillery of medium calibre makes it necessary to protect in a complete manner all the military organs of power in the ship. This obligation is imposed principally for the Whitehead torpedo, the delicate mechanism of which could not resist the shock of the lightest projectiles; these torpedoes with compressed air could not be left exposed to the fire of the enemy without risking the explosion of the air reservoir. These weapons cannot be used except in the protected parts of the ship or below the water-line. Tillers, steering gear, etc., must be rigorously placed out of the reach of the enemy's projectiles; it is not sufficient, however, to protect all the mechanism; the protection of the *personnel*, which is the soul of the whole, and cannot be replaced during the fight, must be considered with the greatest possible care. The captain must not leave the armoured conning-tower in which he directs the movement and the action of the ship; the second and other officers must not either, without necessity, quit the protected posts which have been assigned to them. All movements of the *personnel* under the fire of the enemy should be rigorously proscribed or only effected under

the protection of the side armour. From these results the necessity of establishing a complete system for transmission of orders from the conning-tower to all parts of the ship, which will complete in a manner that system of protection for the ship which gives her all her value. To make evident the vital importance of protection during a modern action, it is sufficient, in our opinion, to imagine a duel between two ships: one furnished with a powerful and numerous artillery not protected, the other with a single gun of medium calibre with complete and absolute protection of all her organs. The advantage at the end of a longer or shorter time would evidently rest with the latter; the military power of a ship then cannot be measured only by that of her offensive weapons. In the same way, nautical power cannot be defined only by extreme speed. We should, leaving out secondary arms, consider the protected artillery and all its parts, including its floating support, that it is the sole element characteristic of military power.

The Actual Antagonism between Nautical and Military Power.—We will now rapidly enumerate the arrangements which constitute nautical power and the military power of the ships of war in endeavouring to formulate for each of them the tactical conditions which it ought to satisfy. It is clear that the typical battle-ship should unite the maximum of nautical power and the maximum of military power which science is able to give it. Before enquiring whether the construction of such a ship is possible, it would be instructive to throw our eye backwards on a sailing-ship, which constituted the tactical units of the fleets of war at the commencement of the century. Nothing would be more inexact than to consider the modern ship of war a simple perfecting of the old vessel. Without doubt no comparison can be made between the old smooth-bore guns and the present rifle artillery; on the other hand, it is superfluous to emphasise the superiority of the powerful motive machinery of our ships over the masts and sails of the old ones; we can only say, as we have already, that by reason of the motive power the sailing-ship had a range of action almost unlimited.

Her speed, depending only on perfection of form and sail area, surpassed that of some of the finest sailers of the mercantile marine. Her nautical power could thus be developed to the maximum extent without injury to her military power. Her displacement being superior to any weight of military which could be possibly worked on her batteries, the number of guns by multiplying the gun ports could be brought to a maximum compatible with the size of the ship. This conception was completely realised only in the frigate; in the two- and three-deckers the number of guns and gear introduced for the purpose of augmenting their military efficiency caused a reduction of their sailing efficiency. But although even at this epoch antagonism between nautical and military efficiency was not altogether absent, we may assert that the old sailing-ship attained the highest degree of perfection by almost complete harmony in their various factors of power. The appearance of the first steam engine in our ships marked the commencement of a new era; of a series of ideas and arrangements destined in reality not to perfect the old ships, but to

cause them to disappear by substituting little by little for wood the iron and steel and all the other materials employed in modern vessels of war. Only at the present do we see the complete abolition of masts and sails and the definite adoption of the ship of metallic construction throughout. The different elements of her power taken separately are incomparably superior to those of the ancient ship; but as everything depends on the progress in metallurgical science, the progress of the modern ship is limited. Even at the commencement of her career she meets with a difficulty at present insurmountable, the conflict necessarily established between nautical and military power. Supposing, for example, that we decide to give to a ship of certain form and tonnage the greatest possible speed and range of action. It is clear that, not having to take account of the interior energy she has to carry, the whole of the displacement would be utilised to give her the most powerful machinery and greatest weight of coals that she could carry. All weights consecrated to offensive and defensive power would entail a diminution of her range of action. If, on the contrary, we wished to give her the greatest possible military power, the weight of the guns, turrets, ammunition, and armour would in turn take up the whole available displacement. In the first case, we have created a vessel of extreme speed, but inoffensive; in the second, a strong fort but immovable.

Ships of the Line and Cruisers.—How then shall we solve the difficult problem which we have proposed? Shall we by a compromise between the two terms of power produce a cruiser battle-ship, having in consequence an inferior nautical and reduced military power? We do not think so. The tactician proposes, as we have already said, to obtain the supremacy of the sea in a certain region, that is, to maintain freedom of communication for himself and to interrupt those of the enemy. For the first purpose he must have the most powerful ships, from a military point of view; and, for the latter, faster ships than those of the enemy. Now we cannot require of the naval architect that he should construct vessels which are at the same time the fastest and most powerful. It is in vain to endeavour to obtain the result by a considerable increase in tonnage and consequent cost, for the necessary protection for the organs of defensive power increases rapidly with the dimensions of the hull. The solution which consists, as is done by a neighbouring nation, of constructing ships of great displacement, incompletely protected, but fast and furnished with a powerful artillery, is bad and should be rejected. However rapid and strongly armed these ships may be, they will be powerless to dispute the supremacy of the sea with vessels slower, it may be, but with artillery equally powerful, completely protected by thick armour. We are then forced to admit that the modern ship of war must be double, that the tactical units of our fleets should be, in fact, composed of two factors: the powerful ship of the line charged with maintaining freedom of communication, and the cruiser possessing the nautical power for interrupting those of the enemy. This point gained, it is necessary still to affirm that this separation of the two powers need not be absolute nor lead to a singular assemblage

of vessels powerfully armed but without speed, or of swift cruisers entirely denuded of all serious equipment. In reality, we have not to exact for our battle-ships the greatest quality, but the greatest intensity, of military power, if we may use the expression; for example, if we admit the three-hundred-and-five-millimetre gun is actually the most powerful piece of all our artillery, the ship of the line should carry at least one of these guns, of which all the organs, including the platforms, that is to say, the hull which supports it, is completely protected. The quantity of power can then be obtained by multiplying the number of ships. We have seen elsewhere that it is advantageous to carry four heavy guns (two forward and two aft) of which it is possible to absolutely protect all the organs. This first and necessary condition of the battle-ship being realised, we demand of the naval architect to give her the minimum range of action strictly indispensable for the mission she has to fulfil, and that we shall fix in advance in a definite and final manner the greatest speed of which she is capable with her tonnage. On the other hand, if a speed of twenty-three knots, for example, is that which the best cruisers or mail boats of the adversary can attain, the cruisers of our squadron should unite a speed of at least twenty-three knots to a range of action fixed beforehand, which agrees with their special mission; and we demand of the engineer at the same time the maximum of protected artillery possible. We see then in what a logical fashion the terms of the problem present themselves. In neither case can we dream of imposing on the constructor all the elements of his task; we must leave to him for the battle-ships speed, and the cruisers for artillery; we shall simply consider as most perfect battle-ships those which, without sacrificing their military power realise their greatest speed; and cruisers which, without losing their speed, carry the heaviest armament, in both the utilisation of the financial resources from which results the highest proportion of total power to tonnage. We may add that the tactical unit battle-ship-cruiser is only transitory, these two terms are destined to approach each other to the day, still far off, when by the employment of a metal light enough and resistant enough it will be possible to unite their elements in a single type.

Specialisation of War-ships.—The ship of war, whether of the line or cruiser, fulfils then the factors of military and nautical power, but certain of these factors, protected artillery, or high speed, alone reach their maximum intensity so as to constitute the dominant quality of the ship and to class her in one or the other of the two great divisions that we have established. It has often been sought to push this division of work further in specialising the war-ship, in preserving, for example, a single element of her power and reducing to the minimum or even annihilating all the others. We can thus obtain the ship of extremely reduced tonnage, and yet very efficient from the special point of view we seek to realise. Amongst the different attempts of this nature, attempts which, let us remark, have all been condemned more or less completely by experience, we may cite in the first place the torpedo-boat, of which the military power is constituted by a single offensive arm, and of which the nautical power resides only in high speed. The absence of all protection, on the one hand, and the reduction of

the range of action to the minimum on the other, cause the antagonism of the two powers to disappear, and constitute, during a very short time, it is true, but with small and economical dimensions, an elegant solution of the naval problem. It should be remarked that the torpedo possesses actually only one of the qualities of a weapon of war efficiency; it cannot remain without danger exposed to the fire of the enemy, and requires minute and frequent adjustment. It is subject to various injuries which hamper its action, it is in reality neither safe, nor simple, nor robust, and may be defective at the precise moment when it is required to be used; besides, and in spite of all sighting apparatus, the fire of the torpedo is uncertain, and should not be carried out except at short distances. Now the torpedo-boat denuded of all protection, cannot, however small target it presents, approach the battle-ship which it attacks except at great risk. These risks are such since the adoption of quick-firing artillery with a flat trajectory, that it ought not in the majority of cases to attack by day but should be content to act at night and by surprise; we may add that she is sensibly defective in navigability, an essential quality for all ships of war, a heavy sea causes a loss of speed and considerably interferes with the action of her mechanism. The torpedo-boat is then far from being for battle-ships and cruisers the redoubtable adversary that has been supposed, if we reflect that her tactical speed is not very superior to that of battle-ships and cruisers, and that, by presenting their sterns to her, they can keep her a long time under a destructive fire; and that, besides, theoretically a surprise can always be avoided; we are led to conclude that if she is not soon to disappear like the ancient fire-ship has disappeared, the modern torpedo-boat must be transformed. The weapon which she carries must be perfected and given the protection which it requires in becoming submerged, or, at least, be rendered practically submergeable at the moment of attack. It would be premature to consider the consequences which this solution would entail, but such a problem is already foreseen. The idea of the ram-ship is otherwise, the only arm of which, the ram, possesses, as we have already said, the sum of the qualities which we can expect of a weapon of war—simplicity, safety, strength, and efficiency, and for which can be realised the absolute protection of the motive organs. We have already spoken of the difficulties which combat by shock represents. The ram-ship, altogether impotent against a faster foe, cannot acquire the speed which she wants without losing something of the complete protection, which is her *raison d'être*, only by possessing dimensions comparable to those of the ships which she attacks. Up to now, we have been of necessity led to utilise her in a surer manner by giving her torpedo-tubes and heavy artillery. The ram-ship thus transformed by force of circumstances has become, with a high speed, the armoured battle-ship of our squadrons, and with less speed and dimensions the armoured defence ship of which the principle rôle is to serve as an auxiliary to the coast batteries and form the tactical unit of the defence fleets. As we see, the attempts at specialisation of the battle-ships to the end of attaining restricted dimensions are fatally destined to failure, it is impossible to obtain a mean between the two extremes—the submarine

and the battle-ship. We shall only speak then in passing of two other specialised ships of war, the gun-boat and the mortar-boat, the conception of which has recently none the less made some noise in naval circles. The nautical power of these ships lies, as in torpedo-boats, in a momentarily high speed, and their military power is an offensive weapon destitute of all protection. The gun-boat carries simply a gun of medium calibre—an arm useless against armoured battle-ships or even protected cruisers. It has all the defects of a torpedo-boat, without the advantage of efficient weapons, and without the power of submergeability. We may say as much for the mortar-boat, we can certainly conceive the light-ship furnished with a shell-gun of large calibre launching a projectile charged with a powerful explosive, a sort of projectile torpedo, the shock of which would produce on the upper works of a battle-ship a considerable destructive effect; such a ship is a veritable torpedo-boat, condemned as she is to act at night by surprise, and at short distances, for the aim of a bomb with curved trajectory requiring absolute stability of platform is impracticable on a small ship. As to the bombardment of fortified positions it seems that the ships of the fleet, thanks to their endurance, their protection, and their range of action, are incomparably better qualified to execute this operation than the light ships of which we treat, incapable as they are moreover, however numerous they may be, to maintain a blockade in heavy weather. Let us then leave on one side the dream of the naval nobody, and affirm with a large majority of officers the necessity for large ships, at the same time sea-going and powerful, which alone can make them efficient masters of the sea. It remains to say a few words in conclusion on a class of ships which cannot properly be called ships of war, but which, nevertheless, are called on to render most important services. To this class belong those ships in which military power is suppressed in order to obtain the maximum of speed, united with a certain range of action, and amongst these we place despatch-vessels in the first line, which serve as a connection between the two elements of which our fleets are composed—*i.e.*, battle-ships and cruisers. Such a ship, to which we give sufficient tonnage to enable her to keep the sea in all reasonable weather and maintain her speed, has not to fight even her equals; her only object is to bring to their destination orders and information which she carries from one group of ships to the other which she would accompany. If it is possible to do so without detriment to her nautical qualities, we might give her a light quick-firing armament, suited to act against torpedo-boats. The despatch-boat, cruiser, or squadron-scout is in some sort the connecting link with the tactical unit, the battle-ship-cruiser, which she permits to develop all her power without the disunion of the elements. Finally, we ought not to forget that the commercial route war, in spite of the secondary rôle which we assign to it, completes the programme which we have traced for the swift cruisers of our fleet, their mission being to interrupt the communications of the enemy. It will thus be advantageous to have amongst these latter, ships capable of acting effectively against merchant-ships, that is to say, endowed with high speed, great nautical and a cer-

tain amount of military power. Subsidised mail boats, furnished with medium calibre guns, usefully fulfil this object. It is important to remark that we should never give up the maintenance of our commercial routes except in the presence of an enemy incontestably master of the sea. Although supplies by the maritime frontiers may be carried out under a neutral flag, we could and might be obliged to utilise the national mercantile fleet for this object in the majority of cases. It is then theoretically not a wise policy to withdraw, at great cost, the mail boats of our great national companies from their exclusively commercial mission. It would be preferable to provide special ships of large displacement, extended range of action, and great speed, constructed for this particular work. A few of these cruiser-privateers, stationed at the commencement of hostilities at suitable points, would render great service in paralysing, or at least doing great injury to, the commercial trade of the enemy.

THIRD PART.

Modern Fleets.—Squadrons are collections of war-ships designed to act simultaneously—that is, capable under all circumstances of concerting their movements and their action. The tactical unit being necessarily composed, as we have seen, of two terms, the battle-ship and the cruiser, combining their powers to obtain complete control of the sea, the squadrons should be composed of equal numbers of battle-ships and cruisers. Squadrons of the first line, which are the highest manifestation of the naval power of the country, and which must bear the first brunt of the battle, must be composed of vessels which possess the greatest intensity of military power, united to the highest possible speed, and of cruisers which possess a nautical power superior, or at least equal, to that of the enemy's cruisers, and at the same time provided with armament and protection as complete as possible. Fast battle-ships and armoured cruisers, united by scouts, above all seaworthy and of great speed, thus constitute the only theoretical elements of such a fleet. By reason of the incessant and parallel progress in all branches of nautical science, the most recent ship of each type, speaking generally, will alone possess the whole power which the latest results of metallurgical science can give her; and this cannot be avoided. To lay down simultaneously a number of ships of the same model, followed by an unavoidable delay in construction, would result in the formation of a squadron which, after a few years' service, would only be able to oppose inferior types to the most recent units of the enemy. The constructor, in fact, has not the power to modify his work. Retouches practised with discernment, changes of artillery and boilers, may without doubt, considerably ameliorate the conditions of the ship from a military point of view; they can but rarely increase her nautical power. The tactician finds himself practically face to face with units of war of different types and qualifications, amongst which he must choose with care the units forming the squadron of the first line, capable of always combining their movements to a common end.

Homogeneity. — In order to ensure concerted action under all conditions, it is necessary that the ships of a squadron should be homogeneous; and it is important to define what is meant by this homogeneity which we require as a necessary condition for squadrons of the first rank. We cannot demand that all these ships should be alike. Remembering the axiom formulated at the commencement of this study, that the military power of the fleet is equal to the sum of the military power of its units, we may say that, from a strictly military point of view, it would be best to unite the greatest possible number of ships, whatever may be their strength. It is nothing of the sort. We know that the nautical power of the whole is exactly equal to that unit of it which possesses the least. The addition of a single battle-ship of feeble nautical power reduces the nautical value of the whole squadron, and the tactical inferiority which thus results may counter-balance to a large extent the advantage gained from the military qualifications of this single ship. We see that it is as necessary to choose battle-ships for the first line only amongst those which possess the wished-for homogeneity of nautical power. From the point of view of navigability, for example, it is clear that all the ships of the squadron should be capable of withstanding the same degree of heavy weather at sea. If one of them is forced to slacken speed, the whole squadron must do the same, if they are to act in concert. A conclusion of the same kind is imposed on us in the matter of range of action, which is, as we have seen, a determinant factor in the ship of war, and, consequently, of the fleet. The work expected of a naval force in time of war is that it shall be able to cover at fighting speed, or at economical speed, a given distance; battle-ships following the most direct route, cruisers having to open out to form divisions of contact, for chasing and scouting, and consequently having to cover a greater distance than the battle-ships, but equally determined beforehand. The despatch-vessels and scouts proper, having to serve as the connecting links between the different fractions of the naval force, have need of a still more extended range of action, and proportional to the two first. We have not to consider here what should be the relation and absolute value of this range of action, the whole of which constitutes the range of action of the first squadron of the line, as it must be determined by the authorities after experiments in time of peace, according to the object which it is proposed to pursue in time of war. This determination should logically precede, let us repeat, the conception and construction of the ships destined to form part of the squadron, and it is evident that we can only add to their number later ships possessing a range of action at least equal to theirs. We should carefully exclude those ships which may be forced to remain behind precisely at the moment when the execution of the principal strategic movement for which the fleet is organised is being carried out, and cruisers and scouts which would not be able to fulfil their mission just at the last moment of the projected operation.

It is necessary to add that the provision of victuals, fresh water, and coal, etc., should last the same time in all the ships in the squadron; a great excess in some of the ships over the others would only mean a useless load, occupying space and tonnage, to the detriment of the real power of the fleet. We must hold a similar reasoning as applicable to speed. The fighting speed can only be that of the slowest unit, and in a squadron we consider the superior speed of the newest ships will only be able to be utilised under exceptional conditions; but, on the other hand, we should exclude ships whose speed would give to the squadron a manifestly tactical inferiority. This last reflection applies with equal or greater force to cruisers and scouts, which would be always able to utilise their high speed when operating alone, but if their speed is inferior they become for the squadron an encumbrance rather than a help. In conclusion, the homogeneity of the nautical power in the units of the squadron, which we argue for, resides in the wisely regulated harmony of these factors, navigability, range of action, and speed, and we may state that such harmony can only be attained by vessels of large displacement. Although the scouting ships can reduce their military power to a minimum, and devote an insignificant portion of their capacity to the power of their armament, the necessity of attaining a high speed, navigability, and a range of action very superior to the battle squadron for which they have to scout, inevitably leads to large displacements, and it appears to us cannot be less than from four thousand to five thousand tons.

Light Divisions.—We are thus led to exclude from the squadrons of the first line the light ships, torpedo-boats, and torpedo-boat destroyers, which in time of war would only serve to embarrass them and prove a danger. There are without doubt conditions in which a squadron might find torpedo-boats of great service, and for these circumstances the commander-in-chief might with advantage form light independent divisions, stationed at suitable points, where they could be allowed to co-operate in the general plan of action. But these combinations which are purely strategic, have nothing to do with the tactical conception of the squadron which we have sought to realise, and which should only comprise, under the name of Light Division, scouts of large displacement such as we indicate above. The torpedo-boat catchers or destroyers should only under exceptional circumstances accompany a squadron as a guard. Their limited range of action makes them unfit for scouting service, and they are more pernicious than useful in an attack by torpedo-boats at night by surprise. We consider then that their sphere is to act always alone on the coasts and against the mobile defences of the enemy.

Reserve Squadrons.—Although the squadrons of the first line can only be composed of ships of recent construction, possessing the wished-for homogeneity of nautical power, it does not follow that the tactician must entirely discard the older units of different types. These ships of the second order constitute with the homogeneity which they possess, the Reserve Squadron destined to play a determined and considerable part in time of war. It is an error to believe that this squadron could be advantageously combined with the active squadron at the moment of

hostilities. They would probably only prove an element of weakness, and it would be preferable to face the enemy with a force less numerous, but homogeneous and of high speed. The formation of strong reserves is as necessary for the fleet as for the army, and the admiral who would consent to do without them would commit an error comparable to that of the general who would engage the whole of his troops in the first action, and thus see himself exposed at the first check to complete and irremediable defeat. It is certain that the meeting of two fleets of the first line in action will leave scarcely one of their units intact. Victory at sea in general will consist in occupying and holding certain positions, and will be to that fleet which has sustained the least damage. The old fleets above were able to continue their cruising and operations after a victory. To-day, as numerous recent examples show, it is probable that victors and vanquished will both have to rejoin their bases of operations as quickly as possible to repair and replenish, and will be for some months unable to put to sea. It is then that the Squadron of Reserve would enter into line. We may affirm that the real victory with all its consequences will belong to the one of the two countries which has a reserve for this instant capable of becoming incontestably masters of the sea after the first shock and temporary disablement of the squadrons of the line.

The Defence Fleet.—Although inferior from a tactical point of view, the Reserve Squadron should possess a homogeneity of its own which permits it to concert the action of its different units at sea. The fleet for the defence of the littoral, on the contrary, can admit and utilise ships of the most dissimilar types. It has only to concert its action with the forts and batteries of the coast, and only requires an insignificant nautical power. Always within call of the dockyards and magazines, it can renew its supplies without interruption. The head of the defence fleet is no other than the head of the Admiralty, who resides on shore, and commands the whole of the defences of the coast and naval ports. His only care is to use to the best possible advantage the qualities of the ships under his orders, and which will easily find their places in the whole organisation, the principal lines of which we have above sketched out. He would thus, for example, dispose of the torpedo-boats for guarding the channels, protecting the coast-line, and following and harassing assailants; but he would not use them for the purposes of scouting, for which the torpedo-boat, which has a restricted view and little endurance, is as little as possible suited. The true scouts of the coasts are the signal-stations, and light ships must be added, which could rapidly scour the neighbourhood and make their reports to these stations. Torpedo-boat destroyers and catchers could usefully protect coastguard ships of slow speed which would have to be stationed on the littoral. The fleets, and, in particular, the mobile defences, could incidentally lend their aid to the sea-going squadrons when the theatre of the naval action was in the neighbourhood of the base of operations.

Foreign Service Divisions.—The squadron of the first line, the reserve squadron, and the defence fleet, constitute the three divisions of the whole fighting fleet properly called, the double mission of which is to maintain

free communications on its own coasts and obtain the command of the seas adjoining its own territories. We know that after having secured this first object, the Navy should be able to defend the interests of the country at all points of the globe at which they may be menaced. Naval actions in distant seas can only be an extension of the hostilities engaged in by the two Powers in the home waters. The opponents have both, in this case, the same reasons for keeping the above three main divisions of the Navy in the neighbourhood of their coasts, and to send abroad only cruisers of great nautical power. These cruisers will be advantageously grouped in time of war to form divisions of homogeneous cruisers, having for their object the protection of the colonies and the national trade, and to attack the colonies and trade of the enemy. Their action will be exercised in fixed districts between limits determined by the position of fortified bases where they would be sure of obtaining supplies of coals and provisions and other necessities. A distant maritime war possesses an entirely different character when it is waged against other than a European nation. Against a native population, deprived of all means of carrying on a naval war, ships of light draught, capable of ascending rivers, will render great service. They should immediately be disarmed in case of a European war, so as not to give the enemy an occasion for an easy victory. If the enemy has a fleet at his disposal, it is evident that the naval force to oppose it must be proportional to the strength of this fleet, and if the fight has to be carried on against regular battle-ships and modern armoured cruisers, similar units will have to be provided for service in foreign waters. Divisions of cruisers in this case become totally insufficient, and must be replaced by squadrons, and this is not possible unless the bases for the fleet beyond the sea are increased in proportion so as to become regular arsenals capable of serving as centres of operations.

Naval Bases for the Fleet.—The transformation of the old fleets has lost them in great part—the independence of their movements. It is not only the capital question of combustibles which prevents them from keeping the sea, and in general constrains them only to move from necessity and as economically as possible from one point to another; the necessity for ammunition compels them to repair to the only points where these stores have been collected in advance. Modern battle-ships cannot repair themselves, nor be careened at any part of the globe. Particular tools and gear are required for the numerous machines and apparatus with which they are fitted, and the slightest damage to the hull necessitates a visit to the dry dock. Repairs by neutrals is rightly considered a violation of the laws of neutrality. Without insisting further on the point, for the above reasons the modern battle-ship cannot do without a base of operations where all her needs can be supplied. We may say that the arsenal or dockyard now forms an integral portion of the fleet; that it is its natural and indispensable complement, and that to fulfil completely the rôle which is assigned to it, it is necessary in the first place that it should be fortified; defended both from the land side and the sea against an attack. Not only the workshops, magazines, and docks should be

beyond the range of the enemy's projectiles ; the harbour itself should be strictly closed, so that the vessels which are moored there may be in absolute safety to dismount their engines and overhaul their machinery. With these conditions only is the arsenal a true base of support, and centre of operations for the fleet, where it can be supplied with all the energy it may need for movement and for action.

Convoys.—The close connection which exists between the squadrons and the dockyards gives to the former a tactical inferiority which all possible means should be used to lessen. To this end a large number of coal depôts should be established on the waters where our fleets are likely to be engaged. It must not be forgotten that these depôts, whether fortified or not, are destined to fall an easy prey to the power of the enemy. Besides this the necessity of combining the movements of the fleet, in order to profit by the provision of their supplies, will considerably interfere with the freedom of their operations. We think, therefore, that the problem will be more completely solved by the addition to the squadron of a convoy of supplies, that is, an escort of transport-ships loaded with combustibles, provisions, and ammunition, capable also of receiving the sick and its wounded, and, if necessary, of effecting changes in the *personnel*. So seductive as this idea is, however, we must allow that it will be generally impracticable until the fleet has definitely acquired the control of the sea. In order not to be exposed to destruction or capture at night by the enemy's scouts, the convoy ships could only be placed in the centre of the fighting fleet, and it is evident in case of a surprise such a position would be very embarrassing. In order not to retard the movements of the squadron, the transports must possess at least the same nautical elements as the fleet, and this would mean a considerable reduction in the amount of cargo they could carry. It would therefore always be wise not to undertake an operation necessitating the addition of transports till after the defeat of the enemy, or at least till he has refused an action and has been forced to it by a combined attack in force against his coasts. The initial and dominant fact of the hostilities should be the meeting of the hostile battle-ship fleets ; but this meeting will always be followed, if not preceded, by operations of the second order—the blockade or the landing of troops—and which will necessitate transports for supplies or for the troops. The organisation of these transports then must be foreseen and provided for by subsidising mercantile ships, or, better still, by building special ships designed for this duty. Independently of this convoy proper, factory-ships, hospital-ships, and torpedo-boat transports would render great service to the fleet, provided they have a nautical power which would permit them to accompany it, and to get out of the way in time in the event of an action.

Conclusions.—It seems impossible to study these problems of naval tactics without at first tracing the main lines of a general plan, giving an exact notion of what battle fleets ought to be, and what it is possible for them to do. In trying logically to constitute the forces with which we have to act we are forced to bring into relief that which appears to be the essential characteristic of the modern Navy: the actual

antagonism between the nautical and the military power of the ships, and the restricted field of action which results from it. Some day, no doubt, this antagonism will disappear. The battle-ships, without losing anything of their military power, will become more and more rapid, and the cruiser, without abandoning any of her nautical power, will be increasingly better armed and protected. These two tactical factors thus tend towards each other, and will end by producing in the future a single type which will respond to all the necessities of maritime war. Fleets then will be similar amongst themselves; home squadrons and foreign divisions will possess the same homogeneity, and will only form a single fleet, able indifferently to act in distant waters or on the home coasts, like the fleets of the home navies. It would be an error, however, from a tactical point of view, to seek to forestall progress by the premature creation of ships and fleets suited for all services, and which would be inevitably condemned to actual inferiority—in one or other of their powers.

NAVAL NOTES.

HOME.—The following are the principal appointments which have been made : Captains—P. F. Tillard to "Dido"; G. Neville to "Australia"; C. H. Adair to "Royal Sovereign"; H. C. Reynolds to "Pique"; C. H. Bayly to "Monarch"; H. C. Baynes to "Diana" and then to "Mildura"; E. F. Fleet to "Edgar"; F. St. G. Rich to "Ringarooma"; F. G. Stopford to "Pearl"; F. Finnis to "Illustrious"; Sir R. Poore, Bart., to Command of Naval Barracks, and as Flag-Captain at Devonport; H. M. T. Tudor to "Venus"; Hon. Stanley C. J. Colville, C.B., to "Crescent." Commanders—A. Dodgson to "Basilisk"; C. A. W. Hamilton to "Rosario"; F. A. R. Bowles to "Hero"; C. H. Simpson to "Egeria"; R. J. Stewart to "Algerine"; N. G. MacAlister to "Torch"; R. G. Frazer to "Phoenix"; C. G. Cradock to "Alacrity."

The first-class cruiser "Europa" arrived at Portsmouth from Malta on the 7th ult. with the relieved crew of the "Ramillies." The sloop "Beagle" arrived at Plymouth on the 7th ult. from the S.E. Coast of America and is to pay off at Devonport. The second-class cruiser "Latona" which has been employed on relief duty to Bermuda paid off at Portsmouth on the 8th ult. The second-class cruiser "Amphion" paid off on the 13th ult. at Devonport from the Pacific. The second-class cruiser "Diana" commissioned at Chatham on the 16th ult. for relief duty to Australia. The sloop "Nympe," from the Mediterranean, paid off on the 16th ult. at Portsmouth. The first-class cruiser "Edgar" commissioned at Devonport on the 20th ult.; she is to convey new crews for the "Algerine," "Phoenix," and "Waterwitch" to Hong-Kong. The first-class torpedo-gunboat "Hussar" arrived at Plymouth from the Mediterranean on the 20th ult., and will pay off at Devonport. The sloop "Beagle" commissioned on the 22nd ult. at Sheerness for service on the South-East Coast of America. The Reserve Squadron has been assembled at Portland under the command of Vice-Admiral Sir Compton Donville for a month's cruising and target practice.

Steam Trials.—The new first-class battle-ship "Glory," of 12,950 tons displacement and 13,500-I.H.P., built and engined by Messrs. Laird Brothers, of Birkenhead, has completed her official trials in the English Channel. A 30 hours' trial at one-fifth of the contract power, and another 30 hours' trial at about four-fifths of the contract power having previously been satisfactorily completed, the eight hours' full-trial power took place on the 23rd ult. It was decided to make this trial over the new 25-fathom course recently marked out by the Portsmouth Reserve, and the vessel proceeded to Portland on the 22nd, having previously completed her anchor trials at Spithead, and anchored there for the night. Proceeding next day, the eight hours' trial was commenced at 8 a.m. Four runs were made on the course off the Start in the teeth of a moderate westerly gale, and under the somewhat adverse circumstances a speed of 18.124 knots was obtained. The vessel was then headed up Channel, and throughout the entire trial the engines and boilers worked satisfactorily. Messrs. Laird are to be congratulated on the success of the working of the boilers, which are the first installation of Belleville boilers that they have officially tried. The results of the trial were as follows:—Mean steam in boilers, 275 lbs.; vacuum, starboard 27 inches, port 26 inches; revolutions, starboard 108.5, port 106.7; I.H.P., starboard 7,021, port 6,724—total 13,745; mean I.H.P., collectively, 13,745; coal consumption, 1.58 lbs. per I.H.P. per

hour. It may be interesting to state the results of the 30 hours' trial at 10,250-I.H.P., which had taken place a few days previously:—Steam, 250 lbs.; vacuum, starboard 27·4, port 26·4; revolutions, starboard 99·4, port 94·2; I.H.P., starboard 5,253, port 5,334—total, collectively, 10,587; coal, 1·7 lbs. per I.H.P. per hour; mean speed, 16·78 knots. After finishing the eight hours' full-power trial, the usual stopping, starting, and reversing trials, etc., were completed. The principal dimensions of the "Glory" are:—Length, 390 feet; beam, extreme, 74 feet; displacement at load draught, 12,950 tons. Her propelling machinery, designed by Messrs Laird Brothers, consists of two sets of triple-expansion engines, each having three vertical cylinders of 30 inches, 49 inches, and 80 inches in diameter respectively, with a piston stroke of 51 inches. They each drive a four-bladed gun-metal screw propeller. The engines are designed to develop 13,500-I.H.P. at full power. Steam is supplied by 20 water-tube boilers of the Belleville type, consisting of 15 generators of nine elements and five of eight elements, with an economiser to each boiler. The total heating surface of generators and economisers is 33,700 square feet, and the grate surface 1,055 square feet. The "Glory" is the first battle-ship of the "Canopus" type built by private contract to be delivered, and there is no doubt that the completion would have been anticipated but for the engineers' strike, and the delay in obtaining deliveries of material of all kinds, particularly the armour.

The new sloop "Rosario" has also completed her trials. The results of her 8 hours' full-power natural-draught trial are appended:—Pressure of steam in boilers, 235·4 lbs.; ditto at engines, 185·4 lbs.; revolutions, 205·3 per minute; I.H.P., high 400·5, intermediate 524·5, low 573—total, 1,498. The contract provided for 1,400-H.P., so that there was a margin of 98 to spare. The speed of the "Rosario" was exactly that estimated by her designer, viz., 13·6 knots per hour. The machinery of the "Rosario" was made at Devonport.

The new sloop "Condor" has satisfactorily completed the whole of her steam trials, and except for the little hitch when her piston-rod became over-heated, and she had to be towed back into harbour, she has gone through the ordeal most successfully, and in one or two respects with even better results than her dockyard-engined sister, the "Rosario." The eight-hours' trial of the "Condor" gave an average I.H.P. of 1,462·5, being 62·5-H.P. more than was required by the contract. This was 35·5-H.P. less than the mean of the "Rosario's" machinery; but the mean steam pressure in the boilers of the "Condor" was 231·7 lbs., compared with 235·4 lbs. in the "Rosario." The engines of the "Condor" worked 197·1 revolutions per minute, while the "Rosario's" average was 235·3. The difference in speed was infinitesimal, the "Condor" averaging 13·68 knots per hour, and the "Rosario" 13·6 knots. The "Condor" had an advantage over her sister sloop in the matter of coal consumption, her average being only 1·55 lbs. per I.H.P. per hour. The "Condor" is to be finished by the end of the financial year, but, as in the case of the "Rosario," overtime will have to be extensively resorted to in order to ensure this.

New Sloops.—On the 10th ult., at Sheerness, the new sloops "Shearwater" and "Vestal" were floated out; they are sister vessels to the "Condor" and "Rosario," which were built in the same dock in 1898. Designed by Sir W. H. White, K.C.B., Director of Naval Construction, they have each a length of 180 feet, a beam of 32 feet 10 inches, a draught forward of 10 feet, aft 13 feet, and a displacement of 980 tons. Their steel plating is a quarter inch thick, sheathed with wood 4 inches thick, to a height of 2 feet above the load draught. The copper sheathing extends to a foot above the water-line. The holds of the ships are minutely divided into water-tight compartments, while above the boiler and engine-room runs a steel water-tight deck, which forms a division between the upper and lower coal bunkers. When completed the sloops will carry square yards on the foremast and mainmast, and will be the exact counterparts in appearance of the "Rosario." They will be armed with six 4-inch Q.F. guns (two

of which will be mounted forward, two aft, and two amidships), four 3-pounder Hotchkiss guns, and two 45-inch Q.F. Maxim guns.

The engines for the "Vestal" have been made in Keyham Factory, where her Belleville boilers are being completed, in readiness for delivery in the course of the present month. The "Shearwater" will be engined by contract, the Thames Shipbuilding Company, which has fitted the machinery of the "Condor," having been entrusted with the work. The machinery of both ships is designed to indicate 1,400-H.P. with the natural draught, their speed being estimated at 13½ knots per hour. The stem and rudder-posts of the sloops are castings of phosphor bronze.—*Engineering and Naval and Military Record.*

The Navy Estimates.—The following is the Statement of the First Lord of the Admiralty, explanatory of the Navy Estimates, 1900-1901, presented to Parliament :—

The Navy Estimates for 1900-1901 amount to a net total of £27,522,600, being an increase of £928,100 beyond the amount of £26,594,500 voted for the year 1899-1900.

Of this sum of £928,100 the various Votes connected with the *personnel* account for £447,600. The greater part of this amount is due to the increase in the numbers voted. Among other causes which have contributed to produce this increase are the grant of higher pay to the Marines sanctioned last year, and various improvements in pay and allowances to the Medical Service.

The miscellaneous Votes show an increase of £27,900.

The Works Vote shows an increase of £50,700.

The Vote for Ordnance is increased by £293,900, which, however, includes a sum of £117,000 for ammunition transferred to the Army in this financial year, and which, though paid for, could not be replaced until next year.

Vote 8 shows a net increase of £108,000. The three sub-heads of which it is composed show the following comparison :—

Section I.—Dockyard wages, etc.—Increase	£95,000
Section II.—Naval stores, including steam vessel coal	
—Increase... ..	285,000
Section III.—Contract work—Decrease... ..	272,000

A considerable amount of unforeseen and exceptional expenditure, for which otherwise a Supplementary Estimate would have been necessary, has, with the consent of the Treasury, been defrayed out of the unspent balance on the vote for contract work. Among the principal items are upwards of £350,000 excess expenditure on coal, due partly to increased cost, partly to operations in connection with South Africa, partly to strengthening of stocks; about £300,000 on the victualing vote; £50,000 for extra dockyard labour; nearly £300,000 for increased prices and increased purchases of Naval Stores other than coals. Smaller additional sums have also been spent on sea conveyance, telegraphic communications, and miscellaneous items. The state of war with the South African Republics, and its attendant circumstances, naturally caused a considerable expenditure beyond that provided for in the original Estimate. The total additional expenditure thus incurred, or still to be incurred during the financial year, amounts to a little more than £1,000,000.

NUMBERS.

The total number of officers, seamen and boys, Coastguard, and Royal Marines voted for the year 1900-1901 is 114,880, being an increase of 4,240 as compared with the number voted in the year 1899-1900.

The total number borne on the 1st February, 1900, was 110,273, leaving 367 to be added in the last two months of the financial year. The number similarly borne on 1st February, 1899, was 105,280. Recruiting generally has been good, and it is expected that the total number voted will be probably reached by the

1st April next, though there may still be a falling off in some of the artificer ratings.

The additions proposed are composed as follows :—

Officers	...	...	...	...	...	...	220
Petty officers and seamen	...	...	...	...	...	...	3,050
Engine-room staff	...	...	...	...	...	...	150
Miscellaneous	...	...	...	...	...	...	200
Marines	...	...	...	...	...	...	300
Apprentices (artisan ratings)	...	...	...	...	...	...	320

4,240

Consequent on the gradual increase in the list of captains and commanders, sanctioned by Order in Council of November, 1898, the number of officers eligible for higher rates of full and half pay has been proportionately increased.

The promotion, status, and pay of engineer officers have been recently considered by a Committee of the Board, with the result that the following changes have been approved :—

The list of chief inspectors of machinery has been increased from 5 to 8, and that of inspectors of machinery from 8 to 13.

The engineer-in-chief has been given the relative rank of a rear-admiral.

The rank of staff engineer has been abolished.

Chief engineers will rank *with* lieutenants of and above 8 years' seniority, while engineers on promotion will rank *with* lieutenants of less than 8 years' seniority, instead of as now, with but *after* lieutenants.

In other respects the relative rank of engineer officers remains unchanged.

Engineer will be given a new scale of pay, viz. :—

On promotion	...	...	...	...	...	10s. a day
After four years	...	...	...	...	...	11s. „
After eight years	...	...	...	...	...	12s. „

And the allowance of 1s. a day at present paid to senior engineers for all ships will be replaced by a scale varying, according to responsibility, from 1s. to 2s. 6d. per day.

In order to further encourage signalling in the Navy, an allowance of 8d. a day for instructional duties will be granted to 40 chief or other yeomen of signals in battle-ships, first-class cruisers and depôt-ships, and the "higher standard" allowance of 3d. a day will be granted to an increased number of petty officers and men of the signal class above the rating of signalmen.

The numbers of inspectors-general and deputy inspectors-general of hospitals and fleets have been increased, and the conditions required for promotion to these ranks have been modified.

The period of the course of instruction at Haslar Hospital for surgeons on entry has been extended, and the award of prizes at the end of each session introduced.

The number of medical officers allowed to undergo periods of study at medical schools has been considerably increased, and the privilege extended to the senior ranks.

An additional professor has been appointed on the instructing staff at Haslar in connection with the study of diseases of foreign stations.

Medical officers newly entered will in future be only required to provide themselves with a pocket case of instruments, as all ships bearing medical officers, and naval and marine barracks will be supplied with surgical instruments at the public cost within the next three years.

To meet the difficulty of recruiting suitable men for the rating of sick berth attendant, the pay and prospects of this class have been improved, and the rank of warrant officer granted to the position of ward master at the three principal hospitals. An extended course of training will be introduced for probationers.

The boys' training-ship "Ganges," which had been stationed at Falmouth, has been removed to Harwich, which, it is hoped, will encourage the recruiting of boys on the East Coast.

Consequent on the recommendations of a committee appointed by the Board, the pay and position of domestics have been considerably improved with the object of attracting a more desirable class of men, and of relieving officers of many expenses and difficulties inherent in the former system.

The Royal Marines.

2,585 recruits were raised for the Corps during the year, of whom 676 joined the Artillery branch. The average height of these men on entry ranged from 5 feet 7½ inches to 5 feet 8 inches for the Royal Marine Artillery; from 5 feet 5½ inches to 5 feet 6 inches for the Royal Marine Light Infantry.

The wastage of the Corps for the 12 months amounted to 2,078 men.

An additional annual gratuitous issue of a pair of canvas shoes has been approved for all non-commissioned officers and men serving on shore for the purpose of relieving the feet after marching, etc. This issue will commence on the 1st April next.

The barrack-room accommodation at Walmer is still insufficient for the quartering of the whole of the recruits at the Dépôt, and the temporary removal of the Royal Marine Artillery recruits to Eastney therefore still continues. Additional accommodation, which is also required at the latter establishment, is being provided by the conversion of the married quarters into barrack-rooms. This work will be completed shortly.

The building of the new hospital at Walmer is nearing completion. Steps will then be taken to provide additional accommodation by the conversion of the old hospital into single men's quarters.

A gymnasium has been built at Eastney and taken over for use.

The Eastney rifle range has been completed up to 500 yards, and good progress is being made with the remaining portion.

The negotiations for procuring a rifle range at Plymouth for the use of the Royal Marines have not yet been concluded. Consequently for the greater part of the year the practice was carried out at Browdown. The Army ranges at Tregantle, however, are now temporarily available.

The armament of the gun drill batteries at the several divisions has been improved by the addition of several Q.F. guns; several of the ordinary B.L. guns have also been replaced by Q.F. guns.

At the Chatham Division a new drill battery for light Q.F. and machine guns is building, and will be finished shortly.

A battalion of Marines took part in the Army drills and manœuvres on Salisbury Plain during the month of July. The men were attached to the 3rd Brigade consisting of Guards and Lincolnshire regiments.

The detachment of Royal Marine Artillery lent to the Dominion Government for submarine and defence work at Vancouver Island were finally withdrawn in September last after six years' useful work at that station.

Eight field and six company officers have been lent to the Army for special service during the war in South Africa.

Naval Reserves.

The total number of executive officers now on the active list, who have served for 12 months or more in the Navy, or who are now undergoing 12 months' training, is 267, an increase of 24 since last year.

Vacancies for executive officers are filled up as soon as they occur. There are now 302 qualified candidates on the list of applicants for appointment to the reserve, but only about 50 vacancies can be filled in the course of a year, 20 of which are given to cadets nominated from the mercantile training-ships, "Worcester" and "Conway."

The establishment of engineer officers, R.N.R., is fixed at 400. The present number borne is 380, being an increase of 29 over last year, and it is anticipated that all vacancies will be filled within the next six months at the present rate of volunteering.

The instructional classes for engineers in the Home Dockyard Reserves, commenced in 1898, have been continued. Three courses of six officers are held each year, and the number of applicants is far in excess of the number authorised. The officers who have been through the course have been well reported on for conduct and attention, and have appreciated the instruction and experience afforded.

During the year 1899, 1,292 seamen and 544 firemen were enrolled, as compared with 2,536 and 621 respectively in 1898.

On the 31st December, 1899, the numbers borne, as compared with the numbers voted, were :—

	Voted.	Borne.
Qualified Seamen and 1st Class (old system)	11,700	11,001
Seamen Class and 2nd Class (old system)	11,300	10,961
Firemen	3,500	3,494
Boys	250	256
Totals	26,750	25,712

The numbers voted for 1899 included an increase of 1,000 beyond the numbers voted for 1898, and the above figures show that they have not been obtained.

During the year ending 31st December, 1899, 980 men were embarked for six months' naval training. In 1898 the number was 1,711.

The decrease in the numbers entered and also in those embarked for naval training occurred chiefly in the earlier months of the financial year, when the fishing industry was unusually active. It is also stated that latterly unusually good wages have prevailed owing to the large number of transports employed, and that there have been many vacancies at the docks, owing to reservists' being called up for service with the colours.

The result of the six months' training in a man-of-war on the men is remarkably good, and it is quite easy to distinguish among the men on drill at a Royal Naval Reserve Battery those who have been through the six months' training. The number now serving afloat is 448.

500 Reserve men, including 53 firemen, served in ships during the manœuvres and were well reported on.

All Royal Naval Reserve drill-ships and batteries have now received 3-pounder Q.F. guns, and will all have received 6-inch Q.F.C. guns by the end of the present financial year. Ten Maxim guns have also been supplied. It is in contemplation to supply all Royal Naval Reserve drill-ships and batteries with Maxim guns, and with 5-inch Q.F.C. guns to replace the remaining obsolete M.L.R. guns. A commencement will be made during the forthcoming financial year.

The gun-boat "Gleaner" having proved a success in training the Royal Naval Reserve officers and men of the "President" by taking them to the Nore for target practice with modern 4.7-inch and 3-pounder guns, the gun-boat "Antelope" has been stationed at Portishead to train the Royal Naval Reserve officers and men of the "Dædalus" in the same manner.

Considerable correspondence has taken place with regard to a larger and more thorough development of a system of Naval Reserves in the Australian Colonies, but it has been considered most expedient to await the establishment of one central authority under the scheme of Federation, so as to organise a central system of Colonial Naval Reserve, if an agreement can be arrived at.

Negotiations are still in progress as to the formation of a Naval Reserve in Canada. It is sought to overcome the difficulty created by the requirement of a six months' training at sea in a man-of-war, which is one of the conditions of service in the United Kingdom.

Other plans for strengthening and developing our system of Reserves are under consideration.

MOBILISATION.

The number of vessels and torpedo-boats taking part in the manœuvres in 1899 was 117, manned by 28,839 officers and men.

The total number of Coastguard men embarked was 1,433, and of Royal Naval Reserve, officers and men, 571.

Detachments, consisting approximately of 98 officers and 1,192 seamen and marines, have been landed from the ships at the Cape for temporary service with the land forces in South Africa.

The number of ships in commission for home and foreign service on 1st January, 1899, was 339; on 1st January, 1900, the number was 348.

The effective strength of the number of ships in commission for active service has been increased by the transfer of the officers and men of the ships formerly belonging to the Training Squadron to four modern cruisers, viz., the "St. George," "Juno," "Minerva," and "Cambrian." These ships are still kept together as a separate squadron under a commodore.

During the past year several ships of a new type have been commissioned. The "Canopus" has relieved the "Anson" on the Mediterranean station, and the "Ocean" is about to relieve the "Hood." The "Hermes" has joined the North America Squadron, and her sister ship, the "Highflyer," is now in commission, and will proceed later to the East Indies as flag-ship.

As regards other reliefs, the "Renown" has been replaced on the North America station by a first-class cruiser, and is now the flag-ship of the commander-in-chief on the Mediterranean station. The "Terrible," which was destined for the China station, and the "Powerful," which was on her way home, have been temporarily detained at the Cape. The squadron in South African waters has been further reinforced by five cruisers detached from the Channel, Mediterranean, and East Indies Squadrons.

The four river gun-boats sent out to the China station in sections in the autumn of 1898 were all commissioned during 1899, three for the Yangtze River, and one for the West River. Another of these gun-boats is now on passage out, and, on arrival, will be put together for service in the West River.

Two torpedo-boat destroyers have been attached to each of the Gunnery Schools and one to each Torpedo School for training purposes. It is intended later to attach a sea-going cruiser to each Gunnery School, in place of one of these destroyers, for the purpose of enabling firing to be carried out under modern conditions.

Steps are being taken to provide kits for a further number of 10,000 men of the Royal Naval Reserve and Pensioners when called out for active service, making a total of 20,000 kits that will be ready for immediate issue from the Victualling Yards should the occasion for their use arise.

COALING OF THE FLEET.

Arrangements connected with the coaling of the Fleet have been under the special consideration of the Board. Steps have been taken to increase the reserve stocks at certain of our coaling stations, and experiments are in progress with the object of selecting a patent fuel suitable as a special reserve on the more distant stations.

Arrangements are being made for the institution of a system of supply of coal to certain fleets and dockyards by colliers directly under Admiralty control, a successful experiment in this direction having been made in the course of the year. Efforts are being made to widen the area of supply as far as practicable, and to

take advantage of the coal resources of the Colonies when local coal can be shown to be of suitable quality for H.M.'s ships, and can be supplied at reasonable rates. Steps have been taken to provide for a certain quantity of New Zealand coal from the West Port collieries for use on the China station, and local Australian coal is now used on the Australian station as far as circumstances permit.

TRANSPORT SERVICE.

Since the beginning of July, 181 transports and freight ships (including second voyages) have been engaged in the conveyance to South Africa of a force of 132,384 officers and men, 23,345 horses, and 26,364 mules, exclusive of the troops, horses, etc., conveyed from India and the Colonies under local arrangements, and of certain volunteer detachments and special corps.

NEW CONSTRUCTION.

The abnormal activity in shipbuilding and engineering, which was described in the Statement of last year, has continued during 1899-1900, and has seriously affected progress and expenditure on ships, machinery, and armour: Delays in delivery of material, difficulties in securing adequate numbers of workmen, and other circumstances, have caused the aggregate earnings on contract work to fall short of the estimated amount by about £1,400,000, though the estimate was carefully calculated on the basis of actual earnings in past years on ships of similar character and on very close investigations of the possible output of armour.

While the most marked effect of these exceptional conditions is shown in the Contract Vote, progress in the construction of Dockyard ships has also been somewhat affected, especially in connection with the supply of propelling machinery and armour. It is the rate of this supply which will practically determine the dates of completion of several important ships.

The armour-plate makers have considerably increased their output during the year, and have made large extensions of plant. Their total output will be nearly 50 per cent. greater than it was in 1898-99, but nevertheless the deliveries will fall short of the amount anticipated by £420,000 in value. All of the firms have been fully employed, and there are large orders yet to be executed. The situation is one of some difficulty, but there is every reason to hope that it will still further improve during the next financial year, as new extensions of plant come into use.

The fact that so large a number of ships now in construction are designed for exceptionally high speeds, and will, therefore, be equipped with propelling machinery of great power, also tends to affect the rate of progress. Machinery of this kind can only be produced by firms of the first rank, who are limited in number, and who, in many cases, have other important contracts in hand. Longer periods are required for the manufacture and erection of the machinery, with the natural result of more time being necessary for the completion of the ships.

Battle-ships.

The "Canopus" was commissioned in December last, and is on service in the Mediterranean. The "Ocean" and "Goliath" will be completed this financial year. The "Glory" has been delivered by the contractor, and is now making her steam trials as a preliminary to being taken in hand for completion at Portsmouth. The completion of the "Albion" has been delayed by financial difficulties of the contractors for the engines, but special arrangements have been made for finishing their work, and it is hoped that the vessel will be delivered shortly. The sixth ship of the "Canopus" class, the "Vengeance," is well advanced, and her builders anticipate delivering her at the contract date in July next.

Good progress has been made with the six battle-ships of the "Formidable" class which are building in the dockyards, especially with the last three which were launched in the autumn—namely, the "London," on the 21st September, in nine months after laying down, the "Bulwark" on 18th October, in seven months,

and the "Venerable" on the 2nd November, in ten months. Their completion will depend on the delivery of certain portions of their armour. It is hoped that the "Formidable," "Irresistible," and "Implacable" will be completed by March, 1901, and the "London," "Bulwark," and "Venerable" during the autumn of that year.

Four vessels of the "Duncan" class, building by contract, have been advanced during the financial year, but not to the extent that would have been possible under ordinary conditions.

Two others, the "Albemarle" and "Montagu," have been begun in the dockyards.

Armoured Cruisers.

Fourteen of these vessels are now in course of construction. Particulars of their design have been furnished in previous Statements.

The "Cressy" class were the first laid down, all being built by contract. Two of the six vessels of this class have been launched, and it is hoped that they will be delivered by the contractors during the year 1900-1901. Two others are well advanced.

The "Drake" class includes four vessels, the "Drake" being under construction at Pembroke, and the remaining three vessels in private yards. Considerable delay occurred in the commencement of the contract ships; good progress is now being made, but it is too soon to forecast the dates of completion with certainty.

The new class, described in my Statement last year as vessels of a displacement of 9,800 tons, now called the "Monmouth" class includes four vessels, two building by contract and two in the dockyards, the two latter only lately commenced.

First-class Protected Cruisers.

The vessels of this class which were building at the commencement of 1899-1900 have all been completed, with the exception of the "Spartiate," which, like the "Albion" has been delayed by financial difficulties of the contractors for the engines. It is anticipated that she will be finished in the autumn of this year.

Second-class Protected Cruisers.

Four vessels of this class have been under construction during the financial year. Three—the "Gladiator," "Hermes," and "Highflyer"—are already completed, the last two being commissioned.

The "Hyacinth" has passed through her trials and will be completed at an early date.

Third-Class Cruisers.

Seven of these vessels ("Pelorus" class) were under construction at the commencement of this financial year. All except the "Pandora" will be completed before the 31st March.

It was contemplated to lay down three new third-class cruisers of rather larger dimensions than the "Pelorus" class, and of high speed, and a small sum was inserted in the Estimates for their commencement.

A thorough investigation has since been made of alternative designs for the proposed vessels, and of the designs for vessels of a similar class projected or building for foreign Powers. The action taken by each Power, according to the latest information in respect of such designs, has also been under review. After full consideration of all the circumstances, and weighing the fact that the cost involved in building such vessels is out of proportion to their fighting value and sea-keeping qualities, it has been deemed expedient not to proceed with their construction. In their place it is proposed to build an improved second-class cruiser of the "Hermes" type, with about 21 knots speed, to be built in a dockyard, the cost of which would remain within the limits of liability for the three third-class cruisers sanctioned by Parliament. This design is not yet complete.

Sloops and Gun-boats.

Eight sloops have been in progress. Two will be completed this year, and four next year. The remaining two have been recently commenced.

Of the four gun-boats ("Dwarf" class) two have been completed, one being in commission. The other two, which were delayed at contractors' works, are now approaching completion.

Torpedo-Boat Destroyers.

The total number of vessels in this class is 108. Forty-two have trial speeds of 26 to 27 knots; 62 have trial speeds of 30 knots; and 4 contract speeds ranging from 31 to 33 knots.

Forty of the first category and 44 of the 30-knot class have been completed and passed through their trials.

Of the two of the first category mentioned in the Statement of last year as having new boilers fitted, one has passed the official speed trials, obtaining 26½ knots, and should be delivered shortly. The sister vessel is being prepared for trial.

Of the 18 incomplete vessels of the 30-knot class, 3 have been delivered, but have still to pass their speed trials. Twelve of the remainder were ordered last year under the Supplementary Programme, and are being advanced. The first of these will probably be delivered immediately, and be ready to undergo her official trials.

Of the four remaining destroyers, intended to develop speeds exceeding 30 knots, one obtained 32 knots on her preliminary trials, and has been delivered. She will soon undergo her official trials. Another vessel of equal contract speed is in an early stage of construction. A third, designed for 33 knots, has been undergoing a long series of preliminary trials, but has not yet attained the full speed.

The fourth experimental vessel is the "Viper," which has been fitted with Parsons' Steam Turbine. The contract speed in this case is 31 knots, but it was anticipated that a considerably higher speed would be attained. On preliminary trials (for short periods) speeds of about 35 knots have been reached. It is hoped that the vessel will soon be ready for her official trials; and it is proposed, after these trials are completed, to make exhaustive experiments with her, as great importance attaches to this novel system of propulsion.

Torpedo-Boats.

The two torpedo-boats included in the programme for 1899-1900 are under construction. The contract speed, at ordinary load displacement, is 25 knots.

Royal Yacht.

The new Royal Yacht was ready for her steam trials at the beginning of January, but an accident which occurred to her while undocking at Pembroke, besides damaging the vessel's bottom, revealed a serious miscalculation of weight which will make considerable alterations necessary before she can proceed with her trials.

NEW SHIPBUILDING PROGRAMME.

In the coming financial year it is proposed to lay down:—

- 2 battle-ships.
- 6 first-class armoured cruisers.
- 1 second-class cruiser (improved "Hermes").
- 2 sloops (twin-screw).
- 2 light draught gun-boats.
- 2 torpedo-boats.

Of these, 2 battle-ships, 2 armoured cruisers, 1 second-class cruiser, and 2 sloops will be built in the dockyards, and 4 armoured cruisers, 2 gun-boats, and 2 torpedo-boats will be built by contract.

Summary.

The following ships will thus be under construction in the course of the year :—

- 17 battle-ships.
- 20 armoured cruisers.
- 1 first-class protected cruiser.
- 2 second-class protected cruisers.
- 1 third-class cruiser.
- 8 sloops.
- 2 light-draught gun-boats.
- 4 torpedo-boats.
- 21 torpedo-boat destroyers.
- 1 Royal Yacht.

Financial Provision for New Construction.

The estimated expenditure on New Construction for the coming year, exclusive of Establishment Charges, is less by £395,335 than the sum voted for the same purpose in the present year, the figures being £8,460,146, against £8,855,481 for 1899-1900, but it is larger by £1,131,179 than the anticipated *actual* expenditure for this year—viz., £7,328,967, and if this larger sum should be *spent* in 1900-1901, it will represent an expenditure larger by more than a million than has ever yet been reached. The experience gained in recent years that, after the most careful calculations as to the probable earnings of contractors for hulls of ships, machinery, and armour, the expenditure for New Construction has continually failed to reach the sum voted, has been taken into account in framing the estimate for 1900-1901. If the contractors should earn more instalments than are estimated for in the proposed vote, a Supplementary Estimate would, of course, be necessary.

It should be observed that only a portion of the short earnings in the present year will affect the liabilities of 1900-1901. The financial effect of slower work by contractors is mainly to throw part of the cost on later years.

Machinery and Boilers.

The following vessels have completed their contract steam trials during the present financial year :—

First-class battle-ships—"Canopus," "Ocean," and "Goliath."

First-class cruiser—"Amphitrite."

Second-class cruisers—"Hermes," "Highflyer," and "Hyacinth."

Third-class cruisers—"Perseus," "Pyramus," "Pioneer," and "Prometheus."

Sloop—"Rosario."

Gun-boats—"Dwarf," "Thistle," "Bramble," and "Britomart."

Torpedo-boat destroyers—Eleven, in addition to one which completed its trial between the date of the last Statement and 1st April, 1899.

The battle-ship "Glory," the sloop "Condor," and four torpedo-boat destroyers will probably complete their trials before the 1st April, 1900.

The third-class cruisers "Barham" and "Bellona," and the torpedo gun-boat "Seagull," have been re-boilered with water-tube boilers, the two first with Thornycroft boilers, and the last with Niclausse boilers, and have satisfactorily completed their full-power steam trials during the present year.

The torpedo gun-boats "Skipjack" and "Speedwell" have been fitted with new water-tube boilers of the Reed or small tube type, and with new engines of 6,000-I.H.P. The adoption of water-tube boilers in conjunction with light and quick-running machinery of the torpedo-boat destroyer type has enabled the I.H.P. developed in these vessels to be increased from 3,500 to 6,000. They have both successfully completed their contract machinery trials.

The "Sheldrake," which is fitted with water-tube boilers of the Babcock and Wilcox type, having tubes of a diameter intermediate between those of the large and small tube type, has completed an exhaustive series of sea-going trials similar to those carried out by the "Sharpshooter," with satisfactory results, and with a view to further experience with these boilers, orders have been given for a set for the new sloop "Espiegle" now building.

The "Seagull" fitted with water-tube boilers of the Niclausse pattern is now in commission and is undergoing a series of sea-going trials similar to those carried out by the "Sharpshooter" and "Sheldrake," which are fitted with the Belleville and Babcock and Wilcox types of water-tube boiler respectively.

Dockyards.

The work in the Royal Dockyards continues to be performed in a satisfactory manner.

The numbers of men employed in the six Home Dockyards have had to be increased considerably during the current year, to meet the requirements of the Service. The total number to be employed in 1900-1901 in dockyards at home and abroad is 32,340.

Special care is being taken to continue to introduce labour-saving machines and tools of the newest description and make.

During the present year changes have been made in the status and pay of the subordinate officers of the Dockyards, and the office of "Inspector" has been introduced in all trades with a view to improving the supervision of the workmen and removing certain anomalies which existed. It is believed that this change will be generally beneficial.

The scales of piecework rates for the several classes of workmen have been very much amplified in order to ensure greater uniformity in the rates of pay for different kinds of work. The results of the working of the new scheme have been very satisfactory.

The general tendency of modern cruisers to increase in length has made it necessary that longer building slips should be provided at the dockyards. The action taken is referred to in this Statement under "New Works."

The scheme for adapting Haulbowline Dockyard for repairing Her Majesty's ships, and making the best use of the fine dry dock there, is now drawing near completion, and the work done at that dockyard is increasing. It has, therefore been decided to make some additions to the professional staff, and to place a certain number of men on the establishment as at other yards.

The Naval Yards abroad have been fully employed in carrying out the work of repairing ships for recommission, and also on the ordinary necessary repairs, etc., to commissioned ships.

The increase of the fleets on the Mediterranean and China stations has rendered the large extensions of the dockyards at Malta and Hong-Kong, which are being carried out under the Works Loan, urgently necessary.

Large Repairs during 1899-1900.

The following ships have been or will be completed in the home yards :—

Dreadnought.	Talbot.	Sybille.	Bellona	Hussar.
Blake.	Astræa.	Pallas.	Calypso.	Seagull.
Blenheim.	Fox.	Phœbe.	Basilisk.	Magpie.
Gibraltar.	Intrepid.	Archer.	Speedy.	Redbreast.
Grafton.	Pique.	Scout.	Skipjack.	Partridge.
Hawke.	Scylla.	Cossack.	Speedwell.	Lizard.
Immortalité.	Forte.	Barham.	Harrier.	

The following ships are in hand :—

Anson.	Impérieuse.	Amphion.	Blanche.	Sparrow.
Camperdown.	Narcissus.	Hecate.	Spider.	

The details of the repairs and refits to be carried out in 1900-1901 appear in the Appendix to the Navy Estimates.

Naval Ordnance.

The manufacture of guns is proceeding, and the production has so far kept pace with the requirements of the fleet.

The new 9·2-inch gun will shortly be ready for trial, and will be completed before it is required for ships.

A new gun of 7·5-inch diameter, throwing a projectile of 200 lbs. weight, is under manufacture for trial, and will shortly be delivered.

The conversion of the 6-inch B.L. guns to Q.F. has been completed for all ships which are considered to be worth the expense. Conversion for the Royal Naval Reserve batteries and drill-ships is proceeding, and will, it is hoped, be completed by June, 1900.

Trials of the Vickers-Maxim automatic 37-millimetre (1½-inch) gun in competition with the existing 3-pounder Q.F. gun were carried out during the past year, and it was decided that for naval purposes this gun shows no superiority to the 3-pounder.

The 303 Maxim gun is now being adopted for naval purposes in lieu of the 45, which has hitherto been the naval pattern. This will make the ammunition interchangeable with that used for rifles.

The requirements of ammunition and projectiles for the Navy during the past year have been met, and considerable assistance has been given to the Army since the commencement of hostilities.

Supplies of cordite are well maintained, and the substitution of cordite for powder charges in all Q.F. guns will be nearly complete by the end of 1900-1901.

Trials of projectiles, which have been in progress for some time, have resulted in the adoption of a pattern of shell suitable for the attack of the light armour now being generally adopted for the protection of secondary armaments.

A new pattern of naval cutlass and a new pattern of accoutrements have been approved, and will be gradually introduced.

The replacement of older types of torpedoes is being continued, and the adoption of gyroscopic fittings will result in a considerably increased efficiency of all torpedoes so fitted.

The results obtained from the new types of heavy gun mountings are very satisfactory, the rapidity of fire having been considerably increased beyond previous results.

Designs for new mountings of improved type are being worked out, and the manufacture of all gun mountings now on order is keeping pace with the requirements of the fleet.

Wireless Telegraphy.

The Marconi system of Wireless Telegraphy was tried in the naval manoeuvres of 1899, and proved very successful so long as only one ship was signalling. Signals were taken in successfully at a distance of 60 miles.

Negotiations have been carried on between Her Majesty's Government and the Marconi Company, but the question of terms has not yet been settled. In the meanwhile the Admiralty are endeavouring to procure, for further and more extended trials, some more installations of Wireless Telegraphy, both from the Marconi Company and from other sources.

*NEW WORKS.**New Works in the Estimates.*

The principal new works for which provision is made in these Estimates are:—

A new building slip and workshops at Devonport.

The establishment of a coaling dépôt at the Falkland Islands.

Hospital and other shore accommodation for the "Ganges" training-ship at Harwich.

A new general hospital at Portland to replace the existing huts

Cold meat stores at Gibraltar.

Works in Progress.

The extension of No. 5 slip at Portsmouth is finished. Good progress has been made with the new Angle Iron Smithery, and with the new coaling arrangements. The extension of the jetties will be finished by the end of the financial year 1899-1900.

The new coal sheds at Gibraltar and the extension of the boat house at Malta will also be completed this financial year.

The new cooperage in Plymouth Victualling Yard has been finished.

Some delay has occurred in completing the plans for the new slip at Chatham, but it is expected that considerable progress will be made with this work during the year 1900-1901.

The rifle ranges at Sheerness and Wei-hai-Wei are finished, and those at Eastney and Tipnor are nearly complete.

*Progress under the Naval Works Acts.**Inclosure and Defence of Harbours.*

Gibraltar.—The Admiralty mole extension was brought up to water level by 30th September, 1898. It is now being increased to its full section. About 1,800 feet of Quay Wall have been completed.

The detached mole has been brought above water level for a length of over 1,400 feet.

Three dredgers are at work deepening the harbour.

On the commercial mole the bonded warehouses are well advanced. The extension of the old mole to the eastern end of the viaduct is completed, and the Embankment beyond the viaduct is in progress. The dredging of the trenches for the walls of the western arm is finished, and rubble is being deposited.

Portland.—The whole of the new breakwater was brought up to low water level by the middle of April, 1899, five months in advance of the contract time.

Dover.—*Admiralty Pier Extension.*—Blockmaking for this work has proceeded steadily, and there are now over 1,600 blocks in stock. The temporary staging has been completed for nine bays, that is for a length of about 450 feet, and there are now in use on the staging one 60-ton and two 40-ton Goliaths. Divers have been at work for some weeks preparing the foundations, and block-setting on the permanent work of the Admiralty Pier Extension has been begun.

As a protection to the staging and shipping, a light-ship has been moored off the end of the staging, and a fog-signalling apparatus established on the outer end of the staging itself.

East Reclamation.—The piles for the Trestle Railway have been erected for a total length of 3,650 feet, and the superstructure is completed for 3,200 feet. The foundations of the reclamation wall are complete for a length of 3,050 feet, and the wall itself has been brought up to the level of high water of neap tides for a length of 2,700 feet.

The excavation of the chalk cliff for filling has proceeded steadily, and for a length of about 600 feet the backing of the reclamation wall has been completed to a height of 25 feet above low water.

East Arm.—A commencement has been made with the erection of the temporary staging for this work.

Sandwich, etc.—Blockmaking for the turret widening wall and the making of apron blocks for the east reclamation wall has been carried on satisfactorily.

Adapting Naval Ports to present needs of Fleet.

Deepening Harbours and Approaches.—Work at Chatham and Haulbowline is finished. Dredging is proceeding at Portsmouth and Devonport.

Keyham Dockyard Extension.—Nearly all the mud has been removed from the site of the docks. Good progress has been made with the works generally.

Gibraltar Dockyard Extension.—The new dockyard buildings and the dam for No. 3 Dock are in course of construction. Good progress has been made with the slipways for torpedo-boat destroyers.

Hong-Kong Dockyard Extension.—The recently acquired buildings are being used as stores, workshops, etc., and the necessary alterations are being made in them. The widening of the Queen's Road is proceeding. The contract for the main portion of the work has just been approved.

Pembroke Jetty.—This work has not made as much progress as was expected, and the contract time for completion will be exceeded.

Portsmouth.—Widening Caisson.—Practically completed.

Haulbowline Improvements.—Work is nearly finished.

Chatham Dock.—Tenders will be invited shortly.

Malta Dockyard Extension.—The preparation of the site is proceeding rapidly.

Bermuda Dockyard Extension.—The contract will be let during the present year.

Simon's Bay Dockyard Extension.—The contract particulars are being prepared.

NAVAL BARRACKS, ETC.

Progress on the new Naval Barracks at Chatham, Portsmouth, and Keyham has been very satisfactory.

Sheerness Naval Barracks.—As explained last year, the proposal to build new barracks for the Gunnery School at Sheerness has been abandoned, and a site is being sought at Chatham. No satisfactory arrangements have yet been arrived at for the acquisition by the Admiralty of a sufficient area of land for the purpose; but this delay is of little consequence, as, owing to the difficulty of obtaining sufficient labour, it would in any case be inexpedient to start another large building work at Chatham until the new Naval Barracks and Hospital have made further progress.

Chatham Naval Hospital.—The foundations of the main buildings are completed, and the brickwork is progressing.

Britannia Royal Naval College.—Tenders have been invited. Much work has been done on foundations, preparation of the site, etc.

Magazines.—Work is progressing satisfactorily.

Haslar Hospital Extension is making good progress, and the Infectious Hospital at Haulbowline is nearly finished.

A statement of the estimated expenditure for the year ending on the 31st March 1900, will shortly be laid before Parliament.

GEORGE J. GOSCHEN.

17th February, 1900.

GENERAL.

The war-ships, exclusive of torpedo-boats, launched during the year 1899 for the various Navies, with their tonnage, I.H.P., and estimated speed were as follows:—

Great Britain.—First-class battle-ships:—"Bulwark," "London," "Venerable," "Implacable," of 15,000 tons, 15,000-I.H.P., and 18 knots speed; "Glory," "Vengeance," of 12,950 tons, 13,500-I.H.P., and 18·2 knots speed. First-class armoured cruisers:—"Cressy," "Sutlej," of 12,000 tons, 21,000-I.H.P., and 21 knots speed. Third-class cruiser:—"Pioneer," of 2,135 tons, 7,000-I.H.P., and 20 knots speed. First-class gun-boats:—"Thistle" of 700 tons, 1,350-I.H.P., and 13 knots speed. Torpedo-boat destroyers:—"Viper," (turbine), 360 tons; "Spiteful," "Lee," "Stag," of 360 tons, 6,000-I.H.P., and 30 knots speed.

- Austria-Hungary*.—Torpedo-cruiser:—"Aspern," of 2,400 tons, 7,000-I.H.P., and 20 knots speed. Torpedo-boat destroyers:—"Kigyo," "Python," of 115 tons, 1,800-I.H.P., and 26 knots speed.
- Brasil*.—Coast-defence turret-ship:—"Marechal Floriano," of 3,162 tons, 3,400-I.H.P., and 16 knots speed.
- Chili*.—Training-ship:—"General Baquedano," of 2,500 tons, 1,500-I.H.P., and 12 knots speed. Torpedo-boat destroyers:—"Capitan Thomson," "Lieutenant Rodriguez," of 300 tons, 6,000-I.H.P., and 30 knots speed.
- China*.—Torpedo-aviso:—"Kein Wei," of 875 tons, 7,000-I.H.P., and 23 knots speed.
- Denmark*.—Coast-defence battle-ship:—"Herluf-Trolle," of 3,470 tons, 4,200-I.H.P., and 15 knots speed.
- France*.—First-class battle-ship:—"Suffren," of 12,728 tons, 16,200-I.H.P., and 18 knots speed. Second-class battle-ship:—"Henri IV," of 8,948 tons, 11,500-I.H.P., and 17 knots speed. First-class armoured cruisers:—"Jeanne d'Arc," of 11,329 tons, 28,000-I.H.P., and 23 knots speed. "Amiral Gueydon," of 9,517 tons, 19,600-I.H.P., and 21 knots speed. Second-class cruiser:—"Jurien de la Gravière," of 5,692 tons, 17,400-I.H.P., and 19 knots speed. Third-class cruiser:—"Infernet," of 2,474 tons, 8,500-I.H.P., and 20 knots speed. Torpedo-boat destroyers:—"Framée," of 314 tons, 5,700-I.H.P., and 23 knots speed; "Hallebarde," of 308 tons, 4,800-I.H.P., and 23 knots speed. First-class gun-boats:—"Zélée," "Décidée," of 646 tons, 900-I.H.P., and 13 knots speed. Submarine boats:—"Morse," "Narval."
- Germany*.—First-class battle-ships:—"Kaiser Karl der Grosse," "Kaiser Wilhelm der Grosse," of 11,000 tons, 13,000-I.H.P., and 18 knots speed. Third-class cruisers:—"Niobe," "Nympe," of 2,640 tons, 7,000-I.H.P., and 19 knots speed. First-class gun-boats:—"Luchs," "Tiger," of 900 tons, 1,300-I.H.P., and 13·3 knots speed.
- Italy*.—First-class armoured cruisers:—"Giuseppe Garibaldi," "Varese," of 7,350 tons, 13,000-I.H.P., and 20 knots speed. Torpedo-cruisers:—"Agordat," "Coatit," of 1,313 tons and 22 knots speed. Torpedo-boat destroyers:—"Freccia," "Lampo," of 320 tons and 30 knots speed.
- Japan*.—First-class battle-ships:—"Asahi," "Hatsuse," of 15,200 tons, 15,000-I.H.P., and 18 knots speed. First-class armoured cruisers:—"Idzumo," "Yakumo," of 9,850 tons, 14,500-I.H.P., and 20 knots speed. Torpedo-boat destroyers:—"Shiranui," "Yugiri," "Kagero," "Inazuma," "Sazanami," "Oboro," "Niji," "Akebono," "Urugumo," of 300 tons, 6,000-I.H.P., and 30 knots speed.
- The Netherlands*.—Second-class cruiser:—"Noord Brabant," of 4,033 tons, 9,250-I.H.P., and 19 knots speed.
- Portugal*.—Third-class cruisers:—"Reinha Dona Amelia," of 1,655 tons, 5,000-I.H.P. and 17 knots speed; "São Raphael," of 1,800 tons, 4,000-I.H.P., and 17 knots speed.
- Russia*.—First-class armoured cruiser:—"Gromoboi," of 14,367 tons, 14,500-I.H.P., and 19 knots speed. First-class cruisers:—"Varyag," of 6,500 tons, 20,000-I.H.P., and 23 knots speed; "Diana," "Pallada," of 6,630 tons, 11,610-I.H.P. and 20 knots speed. Torpedo-boat destroyers:—"Delfin," "Som," of 350 tons, 6,000-I.H.P., and 27 knots speed.
- United States*.—Torpedo-boat destroyers:—"Lawrence," of 400 tons, 8,000-I.H.P., and 30 knots speed; "Stringham," of 340 tons, 7,200-I.H.P., and 30 knots speed; "Bailey," "Goldsborough," "Farragut," of 248 tons, 5,000-I.H.P., and 30 knots speed.

FRANCE.—The following are the principal appointments which have been made: Rear-Admiral—X. A. Foret for service at Cherbourg; Capitaines de Vaisseau—A. A. Bellot to be Director of Submarine Defences at Rochefort; P. A. Campion to "Carnot"; A. A. Hallez to "Jemmapes"; H. V. Dutheil de la Rochère to "Dupuy de Lôme"; J. Bellue to "Cassard." Capitaines de Frégate—L. J. Simons to "D'Estrées"; M. G. De Ramey de Sugny to "Galilée"; J. M. Farques to "Rance"; M. A. Cros to "Adour" and Command of Tonkin and Annam Naval Division; E. F. Corrad to Command of *Défense Mobile* at Lorient; R. P. Le Moine des Mares to "Saint Barbe"; R. C. Le Nepvou de Carfort to Command of *Défense Mobile* at Dunkirk; L. J. Pivet to "Manche"; P. P. A. Lecuve to be Capitaine de Vaisseau.—*Journal Officiel de la République Française*.

The Mediterranean Squadron.—For the first time for many years France has now in the Mediterranean a really fairly homogeneous and powerful squadron, which is constituted as follows, under the command of Vice-Admiral Fournier:—

First Division.

First-class battle-ships—"Brennus" (flag-ship of Commander-in-Chief), "Charlemagne," "Gaulois."

Second Division.

First-class battle-ships—"Charles Martel" (flag-ship of Rear-Admiral Roustan), "Bouvet," "Jauréguiberry."

Light Division.

First-class armoured cruisers—"Pothuau" (flag-ship of Rear-Admiral Maréchal), "Chanzy," "Latouche-Tréville."

Second-class cruisers—"Du Chayla," "Cassard," "D'Assas."

Third-class cruisers—"Linois," "Lavoisier," "Galilée."

Torpedo Flotilla.

Torpedo-boat destroyers—"Dunois," "Hallebarde," and the torpilleurs-de-haute-mer "Forban," "Cyclone," "Flibustier," and "Chevalier."

It should be remembered that with the exception of the "Brennus," soon to be replaced by the "St. Louis," all the battle-ships and cruisers have a speed of 18 knots the second-class cruisers have a speed of 20 knots, and the third-class 21 knots. The destroyers steam: the "Dunois" 22.5 knots, the "Hallebarde" 27 knots, while two of the torpedo-boats (the "Forban" and "Cyclone") steam 30, and the two others 26 knots.

The Reserve Squadron, under the command of Rear-Admiral Mallarmé, is composed of the coast-defence battle-ships:—"Bouvines" (flag-ship), "Valmy," "Amiral-Tréhouart," "Jemmapes," "Terrible." The four first-named steam 16 knots and the last about 15; while the torpedo dépôt-ship and cruiser "Foudre" has a speed of from 19 to 20 knots. There are two auxiliary ships attached to the squadron, the "Japon," specially fitted as a collier, and the transport "Bien-Hoa."

Steam Trials.—The new torpedo-boat destroyer "Framée," built at the Chantiers de la Loire, Saint Nazaire, has arrived at Lorient for her trials. She is one of a new type, and her dimensions are as follows:—Length, 185 feet 9 inches; beam, 19 feet 6 inches; mean draught, 9 feet 11 inches; with a displacement of 319 tons. The engines are to develop 5,700-I.H.P., giving a speed of 27 knots; she carries 37 tons of coal, giving at 10 knots a radius of action of 2,300 miles, and of 217 miles at 26 knots. Her armament consists of one 6-pounder Q.F. and six 3-pounder Q.F. guns.

The new destroyer "La Hire," which is fitted with a new type of water-tube boiler, the Normand-Sigaudy, is waiting at Brest to make a prolonged trial, until the weather, which has been very bad, becomes more favourable.

The new first-class cruiser "Guichen" has been making some further trials off Toulon at full speed, using her two side screws, the centre one being disconnected; the result has not yet been made known.

In the Dockyard.—At Brest work is being pushed on as rapidly as possible with the new first-class battle-ship "Iéna," and it is hoped that she will be ready to commence her trials in the autumn. Every effort is also being made to complete the new battle-ship "Suffren"; her armour is now being fixed. The first keel plates of the new armoured cruiser "Marseillaise" have been laid; and work is also proceeding on the "Neptune," "Amiral-Duperré," "Devastation," and "Tage," which are having new boilers, some of their superstructures removed and steel substituted for wood for their decks and fittings. The dockyard authorities have, in fact, their hands so full, that the armoured cruiser "Charner" and the second-class cruiser "Friant," lately forming part of the Tactical Training Squadron, have had to be sent to Rochefort for their repairs.

At Cherbourg.—The repairs and alterations of the first-class battle-ship "Hoche" are now so nearly completed that she is shortly to commence her trials. Belleville boilers have been substituted for old cylindrical ones, her huge superstructure has been much reduced, and it is hoped that her speed will be increased from 14 knots to 15. After she has completed her trials she is to join the Squadron of the North.

The new first-class cruiser "Guichen" is to be fitted at Toulon with a third mast, which is to be placed between the two fore and the two after funnels, on which a Temperley coaling apparatus will be fitted.

The punishment of placing men in irons on board ships of the French Navy has been abolished from the table of punishments, except in the case of mutiny and for the security of the rest of the crew.

The divers of the fixed defence on examining the submarine mines laid in the West Pass, Cherbourg Harbour, found that several had exploded, and great damage had been done under water. It is thought the explosion may have been caused by lightning, acting on a badly insulated wire during the severe storm at the end of January. A violent shock was felt in the town at the time, which was generally thought to be an earthquake, and quantities of dead fish were found on the beach next day.

The Naval Estimates.—Replying on the Marine Budget in Parliament the Minister, M. de Lanessan, explained the reasons which had induced him to modify some of the measures introduced by his predecessor. He had been obliged to re-organise the École Supérieure de la Marine, because the number of candidates presenting themselves were fewer than the appointments to be filled; and as regards the replacing of the special schools on board old harbour vessels, he had followed the advice of his naval advisers who had pointed out the many inconveniences resulting from having these schools on board modern sea-going vessels.

The substitution of submarine boats for submergeable torpedo-boats had been decided on because the trials of the "Narval," as admitted by the inventor, had not given satisfactory results for that type of submergeable boat.

In the discussion which followed, M. Claudinon spoke up for French naval material in general, and said that French naval guns were 15 per cent. better weapons than any others opposed to them. At 6,000 metres (6,561 yards) the remaining velocity of the 305-millimetre (12-inch) gun has a superiority of 60 metres (196 feet) over the English gun of a similar size. "With such guns," he concluded, "the dangers of a naval war for France are not as terrifying as some people would have us suppose."—*Le Temps* and *Le Yacht*.

The new naval programme, of which we gave a summary last month, has not been received with universal approval in France, as will be seen from the following *précis* of an article in *La Marine Française*. The article is, moreover, remarkable, as showing the avowed intention of making preparations for the invasion of England by several corps d'armées :—"This programme is both perfectly logical and perfectly inconsistent; if the lessons of history are forgotten, if fleet actions are still considered the order of the day, if no faith is put in the torpedo-boat, the

submarine-boat, and the fast gun-boat, then it is perfectly right for us to build 15,000-ton battle-ships costing 35 million francs, but we must be logical to the end and demand the construction of a sufficient number to give us victory with certainty, for it is absurd to say that France will be able to vanquish England because the Tricolour will float over six more battle-ships in 1907 than in 1900. It is evident that to have any chance, fleet against fleet, not six new battle-ships only are required, but twenty-four, and these must be completed in two years, not less, else we shall see our rivals holding, and even increasing, their enormous commercial superiority. . . .

"The authors of the new programme are just as much persuaded of this as we are, but they dare not ask for the 850 million francs which these twenty-four battle-ships would entail, and it is thus, that after being quite logical in their conceptions, they show themselves irrational in the application of the principles they profess.

"But it will be said the new programme includes also five 12,500-ton armoured-cruisers. Yes, the same people who propose to conquer England with six new battle-ships propose also to ruin her commerce and industries with five more cruisers—in other words, all we require is eleven new vessels to make an end of the first maritime Power of the world. . . .

"It is clear that the authors of the new programme whose good faith we do not impugn, have never read the well-known lecture by Admiral Colomb, wherein it is so clearly demonstrated that the English destroyers will be more dangerous to our fleets than their battle-ships. . . .

"The flotilla of English destroyers, which numbers already more than 100 vessels, of which not one has an equal in any of the rival Navies, constitute the most formidable instruments of combat that England has created of late years, and we have the deep conviction that it is this incomparable flotilla which is the chief strength of England in European waters. . . . If we are not so stupid as to go and offer them battle, the English fleets will only show how powerless and vulnerable they are ; but a flotilla of destroyers is quite another matter.

"Our official programme gives a place to a flotilla, but what a place ! The 11 armour-clad vessels absorb 370,000,000 francs, leaving only 110,000,000 francs for the 166 vessels of the flotilla, the average cost of each one of these is therefore 660,000 francs, whilst that of each armour-clad is 33,500,000 francs, and, moreover, amongst our proposed flotilla there is not one destroyer similar to those possessed by England. . . . With what tactical idea or strategical purpose the 26 submarine boats are provided it will take a clever person to discover, and as for the 112 torpedo-boats, it is well known that they will not augment our flotilla, but only replace an equal number that have become obsolete. . . . The conception of the armoured cruiser has been capable of defence as long as the flotilla remained in the embryonic stage, but the cruiser is properly only a commerce-destroyer, and of late great progress has been made. The torpedo-boat has been transformed into the submergeable boat of the "Narval" type and the submarine-boat of the "Morse" type, and has become as formidable in daylight as by night ; while the torpedo, by recent improvements, has acquired great accuracy in direction, and its explosive force has been increased tenfold. Finally, the trials of the "Dragonne" have demonstrated that there was nothing Utopian in the idea of the fast gun-boats of light draught throwing heavy, high-explosive shells ; the flotilla is, therefore, now complete, since it possesses the two most powerful weapons of the day—the automobile torpedo and the torpedo shell. . . . Furthermore, France, by the geographical situation of her littoral both in the Mediterranean and the Channel, is in a better position to reap the benefits of a modern flotilla than any other maritime nation in the world.

"France cannot spend on her Navy what she spends on her Army ; it is folly, therefore, to build vessels costing more than 30,000,000 francs each, which one torpedo of 25,000 francs can send to the bottom. . . . France has no need for

fleets of battle-ships, and as it is not possible to make those she possesses sufficiently numerous they constitute a deadweight which paralyses.

"To strike England in the vitals, France requires fast cruisers, and to destroy the English fleets and permit our troops to cross the Channel and Straits of Dover she wants shell-firing gun-boats, torpedo-boats, and submarine-boats, as well as a special *matériel* for rapidly embarking and disembarking several *corps d'armées*.

"This being the case, the following are our proposals for utilising the extraordinary credits :—

Cruisers.—Eight divisions of fast 24-knot commerce-destroyers, three of the "Guichen" type and five of the "Jurien de la Gravière" type. Each of these vessels should carry according to her size two or four small submergeable torpedo-boats, our cruisers would thus be able to track their prey home to port, and in case of battle their small satellites would defend them efficaciously. Allowing 16,000,000 for the "Guichen" type, and 12,000,000 for the "Jurien de la Gravière" type, our 24 cruisers would cost 324,000,000 francs.

Aviso-Mortiers.—Fifty avisos of the "Dragonne" type of 30-knot speed, and with turbine motors and armed with a heavy shell-firing gun; their cost can be put at 80,000,000 francs.

Torpedo-boats.—One hundred first-class boats with turbine and 30-knot speed to cost 45,000,000 francs.

Submarine Boats.—100 submarine boats, 50 defensive of the "Morse" type, 50 offensive of the "Narval" type, to cost 60,000,000 francs.

Special Matériel.—Consisting of tugs and flat-bottomed lighters for rapidly embarking and disembarking troops of all arms, to be assembled in the Channel ports, 10,000,000 francs.

Total.—519,000,000 francs (£20,760,000).

The 250 vessels of the flotilla to be constructed in two years, the 24 cruisers in three years. . . . As the annual Naval Estimates amount to 103,000,000 francs, 211,000,000 extra only will be required, spread over three years, to make up the above-estimated 520,000,000 francs."—*La Marine Française*.

GERMANY.—The following are the principal promotions and appointments which have been made: Vice-Admiral—Thomsen to Admiral. Rear-Admirals *à la suite* of the Navy—Graf von Waldersee, von Eisendecher, and Freiherr von Seckendorff to be Vice-Admirals. Kapitän zur See—Freiherr von Maltzahn to be Head of the Naval Academy; Scheder to "Kaiser Wilhelm II."—*Marine-verordnungsblatt*.

Work in the Dockyards.—The Imperial Yacht "Hohenzollern" is at present in the dockyard hands at Kiel; she is receiving new funnels, her old ones being completely burnt through; her furnaces are also being altered so as to permit of Russian Masut (a species of petroleum fuel) being used, in order to avoid the inconveniences and dirt caused by continual coaling. The fitting of new boilers on board the third-class cruiser "Gazelle" has been completed and the ship has been commissioned for her trials; should these be successful, she will proceed at the end of March to the West Indies. The second-class cruiser "Prinzess Wilhem" has been placed in the dockyard hands at Kiel to undergo thorough repairs and overhaul, among other improvements her wooden decks and wooden fittings are to be removed and replaced by steel.

The work of lengthening the small coast-defence battle-ship "Hagen" amidships is now almost completed, and it is hoped that the ship will be ready for her trials by midsummer; 26 feet 10 inches has been added to her length and the additional room thus gained will be utilised to increase her coal supply, which as the ship was originally designed was only 250 tons; her displacement will be increased by something over 100 tons, and it is also hoped that the sea-going qualities of the ship will also be improved. A sister ship, the "Beowulf" is to be

next taken in hand for a similar lengthening, the work being carried out in the dockyard at Danzig. Overtime is being worked on board the new first-class armoured cruiser "Fürst Bismarck," in order that she may be ready for commissioning on the 1st April; the strength of her complement has now been fixed, and will consist of 568 officers and men. The repairs to the training-frigate "Stein" have been completed, and among other changes her rig has been changed from a barque to a full-rigged ship.

The want of new docks is being much felt at Wilhelmshaven. There has this winter only one of the three docks, Dock No. II., been available for the use of the battle-ships of the First Squadron, and should the proposal for the construction of two new docks for this yard be thrown out by the Reichstag, the difficulty of maintaining the rapidly-growing fleet in an efficient condition will be enormously increased. The sum required for the work will be 11,000,000 marks (£550,000).

A new floating-dock is being constructed by the Howaldt's firm at Dietrichsdorf, which when complete is to be sent out to Dar-es-Salaam in German East Africa; the need of such a dock has been felt for some time, as at present the ships of the squadron, when needing docking and repairs, have to go to Cape Town, which not only is a source of considerable expense, but removes the ships from their stations for long periods. The dock will have a lifting capacity of 1,800 tons, so that large vessels will still have to go to Bombay or the Cape; the cost of the dock will be 600,000 marks (£30,000).

Good progress is being made with the new dry dock under construction at Wilhelmminenhöhe, Kiel.

An unusually large amount of work has been during the past year turned out for the Navy both in the Imperial and private yards, and the numbers of workmen in all the yards have been considerably increased. The number of men employed in the State dockyards of Kiel, Wilhelmshaven, and Danzig was 6,000, 6,400, and 3,000, respectively, making a total of 15,400. Of the principal private yards with Government work in hand, the Vulcan establishment at Bredow, near Stettin, employs 6,450 men; the firm of Bohm and Voss at Hamburg 4,500, and the Krupp Germania Yard at Kiel 3,500. Not only has the work of new constructions been actively pushed, but much has also been done in reconstructing and modernising older ships; while two first-class battle-ships, two cruisers, two gun-boats, and several torpedo-boats have been launched. The ships launched have been:—From the Germania Yard, on the 1st June, the first-class battle-ship "Kaiser Wilhelm der Grosse"; from the Weser Yard at Bremen, on the 18th July, the cruiser "Niobe"; from the Imperial Dockyard at Danzig, on the 15th August, the first-class gun-boat "Tiger"; from the yard of Bohm and Voss at Hamburg, on the 18th October, the first-class battle-ship "Karl der Grosse"; from the Imperial Dockyard, on the 18th October, the first-class gun-boat "Luchs"; and from the Germania Yard, on the 21st November, the cruiser "Nympe." The following ships are under construction at present and still on the slips:—At the Schichau Yard at Danzig, the first-class battle-ships "A" and "D"; at the Imperial Dockyard, Wilhelmshaven, the first-class battle-ship "C," and at the Germania Yard, Kiel, the first-class battle-ship "E"; all these ships are sisters of the "Kaiser Wilhelm II.," now just commissioned for her trials; the fifth ship of the group "F" has lately been laid down at the Vulcan Yard, Stettin, while "G," the sixth, has not yet been commenced. There are four small cruisers of 2,600 tons displacement on the stocks; "C" at the Imperial Dockyard, Danzig; "D" and "E" at the Weser Yard, Bremen; and "F" at the Germania Yard, Kiel. In the Imperial Dockyard, Kiel, the first-class armoured cruiser "A" is on the slip. She is to be launched on the 1st April, and to this end overtime is being worked on her; she will have a displacement of 8,860 tons, being thus smaller by 1,790 tons than the "Fürst Bismarck," and will be larger than the "Vineta" class by 2,960 tons.

The Schulz system of water-tube boiler, which is an improvement on the Thornycroft, is being more and more adopted in the Navy. The battle-ship "Württemberg" has lately received these boilers, and they are to be supplied to the new cruiser "Nympe"; the new battle-ships "Kaiser Wilhelm der Grosse" and "Kaiser Karl der Grosse" are supplied with one-half of their boilers, the old cylindrical pattern and the other half the Schulz, while the battle-ships "Kaiser Friedrich III." and "Kaiser Wilhelm II." have two-thirds of their boilers cylindrical and one-third of the Thornycroft pattern; the new armoured cruiser "Fürst Bismarck" has two-thirds of her boilers cylindrical and one-third Schulz, while all the new ships will be fitted with boilers of this type.

Steam and other Trials.—The new first-class battle-ship "Kaiser William II." was commissioned on the 12th ult., and is now under-going her trials; the engines are expected to develop 13,000-I.H.P., under forced draught, giving the ship a speed of 18 knots. It is expected that the Kaiser during his coming visit to Wilhelmshaven, will take up his quarters upon this ship, which has been fitted out to accommodate an admiral with his staff, and that he will make a short run to sea in her. On the completion of her trials, the ship will take the place of the "Baiern" in the Second Division of the First Squadron.

The torpedo school-ship "Friedrich Karl" has been carrying out near Kiel a series of exhaustive experiments with wireless telegraphy.

The third-class battle-ship "Sachsen" has been commissioned and is carrying out her steam trials off Kiel. The new second-class cruiser "Freya" has arrived from Danzig at Kiel, and will shortly commence her steam trials; her sister-ship the "Vineta" has successfully concluded hers. The "Freya" was laid down on the 2nd January, 1896, so that there have been considerable delays in completing her. The new torpedo-boats "S 90" and "S 91" are now completed and ready for their trials, they are to have a speed of 25 knots; they have been built by the Schichau firm at Elbing, who have six others of the same type under construction. These boats are really torpedo-boat destroyers; they will have a crew of two officers, four warrant officers, and forty-three men, in all forty-nine. They will have a coal supply of 100 tons, which will give them a satisfactory radius of action. They will only carry above-water tubes, and the bow tube with the conning-tower forward are both done away with, a breakwater being substituted. By the new law, each year will see a complete division of six destroyers added to the fleet.

Movements of Ships.—Several ships are to be commissioned on the 1st April.

At Kiel.—The coast-defence battle-ship "Heimdall" joins the coast-defence Reserve Division of the Baltic, which during the winter has consisted of the "Ægir" and "Odin" only. During previous summer months the Reserve Division of the Baltic and North Sea have each been composed of four ships, but this year the strength will be reduced to three, as the "Hagen" is in the dockyard hands at Kiel for reconstruction, and the "Beowulf," attached to the North Sea Division, is in April to be taken in hand at the Imperial Dockyard, Danzig, for lengthening amidships and general reconstruction. The training-frigate "Stein" commissions to take the place of the "Nixe," which is to be paid off and placed in the dockyard hands for thorough overhaul. The small cruiser "Sperber" commissions for service in the tropics, probably the West Coast. The "Grille" commissions for the instruction of officers in home-waters pilotage; while the school-ships "Ulan" and "Hay," "Otter" and "Rhein" commission as tenders, the first two to the gunnery school-ship, and the two last to the torpedo-school-ship for mining experiments. The avisos "Blitz" and "Greif" commission for service with the First Squadron.

At Wilhelmshaven.—The avisos "Hela," "Jagd," "Wacht," and "Pfeil" commission for service with the First Squadron; the coast-defence ships "Hildebrand" and "Siegfried" for the North Sea Reserve Division; the small cruiser "Zieten" for the protection of fisheries in the North Sea, and the special-service vessel "Hyäne" for home surveying service.

At Danzig.—The armoured gun-boat "Natter" commissions for the reserve armoured gun-boat division, and she will be in commission for twelve months, instead of six as formerly.

The first torpedo-boat flotilla will be formed from six of the new torpedo-boats completing at Elbing, "590" to "595"; it is hoped that all these boats will be ready during April.

The New Gun-boats.—The two new gun-boats "Tiger" and "Luchs," which were launched at the end of last year from the Imperial Dockyard, Danzig, are, according to the latest orders, to carry eight 10·5-centimetre (4·1-inch) 40-calibre Q.F. guns in place of the 8·8-centimetre (3·4-inch) Q.F. guns carried by the "Iltis" and "Jaguar," the first of the type. In consequence of the experience gained since the "Iltis" has been in commission, further changes and improvements are to be made in the next one of the class, which is to be commenced in April next; the effect of the changes will be to increase the cost by 250,000 marks (£12,000).

Corrosive Action of Water on Ships.—The results of a very interesting series of experiments by the German Admiralty for determining the action of sea water on various alloys have recently been published. Copper, tin, zinc, and iron-aluminium alloys were experimented upon, in each case twelve strips of the alloy being taken, nine of which were immersed in sea water, and three reserved for standards. The strips were put in sea water, and at the end of eight, sixteen, and twenty-four months three from each alloy were withdrawn and compared with the standards. The results show that iron, tin, and aluminium bronzes deteriorated very little, and there was little difference in regard to decrease of weight or strength even after two years' immersion. When iron and tin bronzes were in contact the former was very seriously attacked, one specimen after two years having lost two-thirds of its strength and four-fifths of its elongation. The conclusion arrived at by the Admiralty is that the corrosive action between different metals depends upon their relative position in the electric scale—metals being practically unattacked when in contact with those electro-negative to them, but quickly destroyed when in contact with an electro-positive metal. Experiments on the action of the atmosphere on alloys showed that iron bronze practically suffered no deterioration, whilst those with large proportions of zinc were rapidly corroded.

War-ships Building in German Private Yards.—The German shipbuilding yards receive an increasing number of orders for the construction of ships of war for foreign Powers. During the year 1899 three German firms—the Germania in Kiel, the "Vulcan" in Stettin, and the Schichau in Danzig—have been engaged in building three armoured and four torpedo-cruisers as well as four torpedo-boat destroyers for the Russian Government. Eight small torpedo-boats have been supplied to Japan, and the Vulcan Yard last year built the "Yakumo," a first-class armoured cruiser of 9,850 tons displacement, for that Power. The Schichau Yard is building torpedo-cruisers for Italy. The "Tamoyo," a torpedo-cruiser of 1,080 tons displacement, has been built for the Brazilian Government in the Germania Yard at Kiel.—*Neue Preussische Kreuz-Zeitung and Mittheilungen aus dem Gebiete des Seewesens.*

MILITARY NOTES.

PRINCIPAL APPOINTMENTS AND PROMOTIONS FOR FEBRUARY, 1900.

Major-General and Hon. Lieut.-General V. H. Bowles to be Colonel of the Manchester Regiment. Brevet Colonel H. D. Williams from Lieut.-Colonel h.p. to be Colonel to command the 38th (the South Staffordshire Regiment) and the 64th (the North Staffordshire Regiment) Regimental Districts. Major-General G. U. Prior to be a Major-General on the Staff to command the troops in the Curragh District. Colonel (temporary Major-General) Sir E. H. Hayter Collen, K.C.I.E., C.B., to be Major-General. Colonel J. A. F. Nutt to be a Colonel on the Staff for Royal Artillery in South Africa. Colonel (temporary Brigadier-General) F. W. Hemming, now a Colonel on the staff, to be a Major-General on the Staff to command a Cavalry Brigade at Aldershot, and to have the temporary rank of Major-General whilst so employed. Major-General L. J. Oliphant, M.V.O., to be a Major-General on the Staff to command a Brigade at Aldershot. Colonel R. H. Murray, C.B., C.M.G., A.D.C., to a Major-General on the Staff to command an Infantry Brigade at Aldershot, and to have the temporary rank of Major-General whilst so employed. The Rev. G. Smith, Chaplain to the Forces Second Class, to be Chaplain to the Forces First Class. Lieut.-Colonel H. R. Roberts, the Lincolnshire Regiment, to be Colonel. Major-General and Hon. Lieut.-General A. C. Cooke, C.B., to be Colonel Commandant of the Royal Engineers. Colonel J. B. B. Dickson, C.B., to be a Major-General on the Staff to command the 4th Cavalry Brigade, South Africa, with the local rank of Major-General whilst so employed. Colonel J. H. Laye, temporary A.A.G. at Head Quarters, to be D.A.G. to the Forces, and to have the temporary rank of Major-General whilst so employed. Colonel H. C. B. Farrant to be A.A.G. at Head Quarters. Lieut.-Colonel and Hon. Colonel A. G. Lucas, Suffolk Yeomanry, to be D.A.G. for Imperial Yeomanry, with the temporary rank of Colonel in the Army. To be Assistant Adjutant-Generals for Imperial Yeomanry, with the temporary rank of Colonel in the Army:—Colonel the Hon. H. G. L. Crichton, commanding Portsmouth Volunteer Infantry Brigade; Lieut.-Colonel and Hon. Colonel H. C., Earl of Lonsdale, Westmoreland and Cumberland Yeomanry; Lieut.-Colonel and Hon. Colonel the Right Hon. G. R. C., Lord Harris, G.C.S.I., G.C.I.E., Royal East Kent Yeomanry; Major and Hon. Lieut.-Colonel E. W. Beckett, Yorkshire Hussars Yeomanry.

HOME.—The following Memorandum of the Secretary of State relating to the Army Estimates for 1900-1901 was issued recently as a Parliamentary paper:—

The Army Estimates of 1900-1901 have been framed under the following abnormal conditions:—

- a. Provision has to be made for carrying on the war in South Africa.
- b. It has been decided to make at once an addition to the permanent strength of the Army.
- c. Temporary measures have been authorised for the purpose of increasing the numbers and efficiency of the force available for the defence of the United Kingdom.

With regard to *a*, it is of interest to compare the regimental numbers of all ranks serving with the colours at home and abroad on the 1st January, 1899, and 1st January, 1900.

Home and Colonies.	1899.	1900.
Household Cavalry... ..	1,298	1,327
Cavalry of the Line	12,169	18,890
Royal Artillery, Horse and Field	10,195	18,803
Royal Artillery, Mounted and Garrison	15,722	18,119
Royal Engineers	7,637	10,210
Foot Guards... ..	7,249	12,008
Infantry	87,085	133,743
Colonial Corps	7,242	8,778
Army Service Corps, etc.... ..	9,266	13,085
	157,863	234,963
India (all arms)	74,467	66,581
Total	232,330	301,544

The above numbers do not include the Militia, the whole of which has been or will be embodied (about 100,000 men), the Imperial Yeomanry (about 10,000 men), the enlisted Volunteers (about 9,000, exclusive of the waiting companies), or a large force of Colonial troops, which may be estimated at about 35,000 men.

The number with the colours is constantly increased by recruiting for existing units and for others to be raised, by the recall from time to time of men from the remainder of the Reserve, and by the enlistment of men for the Royal Reserve battalions to be referred to hereafter.

Taking all these together, and deducting the force remaining in India, the full pay and subsistence of about 500,000 men has to be provided for.

The decrease in the force in India on the 1st January, 1900, as compared with the 1st January, 1899, is due to the fact that :—

- 4 cavalry regiments,
- 2 Royal Horse Artillery batteries,
- 3 Royal Field Artillery batteries,
- 4 infantry battalions,
- 3 mounted infantry companies,

have been temporarily withdrawn from the Indian establishment for the purpose of the war, and brought on to the British establishment.

b. The measures in contemplation for permanently adding to the strength and efficiency of the Army, as well as those intended to meet special and temporary requirements, have already been made known, and it is only necessary to recapitulate them briefly.

The following are the chief permanent additions to our military forces :—

Artillery.

Seven batteries of Royal Horse Artillery and 36 batteries of Royal Field Artillery will be raised, so as to provide the artillery for two more army corps and two more cavalry brigades. Three howitzer batteries for each army corps (12 in all) will also be formed.

In time of peace the new horse and field batteries will be retained on a reduced establishment.

The formation of new depôts for the field artillery will enable Reservists of that arm to rejoin and be equipped at their depôts, like infantry Reservists.

Royal Engineers.—Additions will be made to the Royal Engineers amounting to a total of 2,038 of all ranks.

Infantry.—The growth of our Imperial responsibilities, and, in particular, the course of events in South Africa, render it necessary to increase the force of infantry available to furnish garrisons for Colonial stations.

In June last, before the war broke out, the number of battalions at home and abroad was as follows :—

India	52
Colonies and Egypt	16½
South Africa	6½
Crete	1
Total	76
At home	69
Authorised, but not yet raised	3
Total	72

At that time the garrison of Malta was short by one battalion of its authorised strength. This deficiency may be taken as balanced by the presence of a battalion in Crete.

There was, therefore, an excess of battalions abroad over battalions at home of four. When a third battalion of Guards is stationed at Gibraltar, this deficiency will be reduced to two.

To make this deficiency good, and to meet the certain need for the prolonged maintenance of an increased force abroad, it is proposed to raise 12 new Line battalions, attaching them as 3rd and 4th battalions to existing regiments.

Three Years' Men.

An endeavour will be made to add to the number of men engaged for three years' service with the Colours in each battalion of Infantry serving at home.

It has not, however, up to the present time, been found possible to obtain the full number authorised for each battalion.

Army Service Corps, etc.

An addition of 29 companies (2,220 of all ranks) will be made to the Army Service Corps of 8 Companies (450 of all ranks) to the Army Ordnance Corps, and of 260 of all ranks to the Army Medical Corps. Provision is also made for the pay of two native Indian Infantry Regiments for the garrison of Mauritius, one of these to replace the British Central African Regiment, recently sent to Somaliland. Two more native Indian battalions have been temporarily borrowed to replace British battalions withdrawn from Ceylon and Singapore.

Militia.

The messing allowance given to Militia during embodiment will henceforth also be given to them during the ordinary annual training.

Regimental Transport.

The Militia, Yeomanry, and Volunteers will be provided with regimental transport.

Volunteer Artillery.

The whole of the Volunteer Artillery will be re-armed, part with semi-mobile guns, 4·7-inch, part with 15-pounder field guns. A large number of guns of the former class have been ordered; the re-armament of the batteries, now armed with 16-pounders, can probably be best carried out by placing in their hands the 15-pounders, now with the Royal Field Artillery, and supplying the latter with a new gun, either of the design according to which the field batteries now under construction are being manufactured, or of any still later type suggested by the experience of the war.

c. The chief temporary measures for increasing the numbers and efficiency of the Forces in the United Kingdom are these :—

Cavalry.

The non-commissioned officers and men of the squadron sent to South Africa from the Household Cavalry Regiments will be treated as supernumeraries, and their places filled up by enlistment.

Four cavalry regiments will be formed from men of the Reserve squadrons, now in this country, of cavalry regiments abroad.

Royal Reserve Battalions.

Officers and men who have served in the Regular Forces have been invited to return to the Colours on a short engagement, the men receiving a bounty of £22; officers and men of the infantry will be formed into Reserve battalions, to be designated Royal Reserve battalions.

Officers and men of artillery and cavalry will be utilised with their own arms of the Service.

Militia.

The whole of the Militia will be embodied in the spring, and advantage will be taken of this to give the Force special training in large camps.

It has been decided to increase, in cases of protracted embodiment, the gratuity paid to Militiamen, and to offer bounties of £5 to men re-engaging while in the Militia, or re-enlisting after they have left the Force.

Yeomanry.

Provision is made for giving the Yeomanry special training in camp during the summer. The contingent allowance will be increased from £3 to £5 a man to meet the exceptional expenses involved. Every Yeoman will receive the sum of £5 in consideration of his bringing a horse to camp for this special training.

Volunteers.

Like the Militia and Yeomanry, the Volunteers will be afforded special opportunities of training in camps during the coming summer under suitable conditions as to pay and allowances. The details of these are under consideration.

Recruiting.

The number of recruits raised during the year 1899 was 42,700, as compared with 40,729 in 1898, 35,015 in 1897, and 28,532 in 1896. Taking the number of British recruits alone, 40,207 were raised last year, as against 38,418, 33,722, and 27,809 in the three preceding years. The percentage of "Specials" was 34.3, as against 33.8 in 1898, 29.0 in 1897, and 18.0 in 1896.

Warlike Stores.

The sum taken in the Estimates for warlike stores represents a small part only of the expenditure which will have to be incurred on this account.

The war in South Africa has involved the employment on active service of a force exceeding in number that which has been contemplated in the schemes of mobilisation for service abroad. The equipment of this force and of the Colonial contingents has made large in-roads upon our Reserves, and not only will the stores taken from these have to be replaced, but the Reserves themselves must be largely augmented. The extent to which such an increase is necessary forms the subject of investigations which are still proceeding.

It has been decided to accelerate the completion of the programme for the re-armament of the fortresses at home and abroad which, as was stated in the Memorandum on Army Estimates for 1899-1900, was adopted last year after a general revision of our schemes of defence.

Comparison of Estimates, 1900-01 and 1899-1900.

The total of the Army Estimates for 1900-01 amounts to £61,499,400, while the number of men to be voted is 430,000.

The following table shows the comparison with the figures for the current year :—

	1899-1900.			1900-01
	Original Estimate	Supplementary Estimate	Total	
Vote A	£184,853	£155,000	£339,853	£430,000
Votes 1-16	20,617,200	23,000,000	43,617,200	61,499,400

As regards the total Vote A (men), 212,449 may be regarded as permanent the balance being due to the war in South Africa and to the special measures for home defence. The Estimates show in detail only the normal or permanent establishment.

The £61,499,400 is accounted for as follows :—

1. Normal estimate	£21,777,700
2. Permanent additions to the Army... ..	1,925,000
3. Special temporary measures for home defence	6,228,000
4. War charges... ..	31,568,700

Total £61,499,400

The normal estimate of £21,777,700 shows an increase of £1,160,500 as compared with the original estimate for 1899-1900 ; this is mainly due to the provision made for further instalments of the increases to the Army commenced in previous years, to the provision for the full Volunteer capitation grant, to the rise in prices, and to the additional annuity required under the Barracks Act.

The war charges are based on the assumption that the full field force will be maintained in South Africa till the 30th September, and a reduced force for the remainder of the year, but the Estimates contain no provision for terminal charges, such as the transport home of the troops and gratuities on demobilisation.

Vote 1. —Pay, etc.

This Vote shows an excess of £8,691,000 over the original vote for 1899-1900. due :—

1. To permanent increases of establishment.
2. To temporary increases for home defence.
3. War charges.

In addition to the measures already enumerated for the permanent and for the temporary increase of the Army, Vote 1 provides for the completion of the programmes of increases to the Army commenced in 1897, 1898, 1899.

The principal war charges provided for in this vote are the pay of the Army Reserve re-called to the colours, the pay, etc., of the troops borrowed from India, of the South African local forces, of contingents from Colonies outside South Africa, of the Corps of Imperial Yeomanry, the Volunteer companies attached to Regular units in South Africa, and the City of London Imperial Volunteers, and the wages of the large number of civilians necessarily employed in South Africa as muleteers and on other miscellaneous duties.

Vote 2.—Medical.

The Vote has been nearly doubled owing to the war. All the available officers of the Royal Army Medical Corps ordinarily on the Home Establishment have been sent to South Africa, and their places at home have been filled by the employment of retired officers and civil medical practitioners. In addition a large number (223) of civil surgeons have been sent to the seat of war. The services of seven surgeons of eminence have been accepted as " Consulting Surgeons " to the Army in the Field. The Army Nursing Reserve, which was constituted in 1897, has been largely drawn upon to supplement the Army Nursing Service in the Field and at home, and the services of members of the St. John's Ambulance Brigade have

been largely utilised. Provision has been made for a large increase of officers of the Royal Army Medical Corps, and a further addition has been made to the establishment of non-commissioned officers and men.

Vote 3.—Militia.

Provision has been made for the embodiment for the greater part of the year of the whole Militia, and for the already explained increase in the bounties. Money has been taken in other Votes for the supply of regimental transport.

Vote 4.—Yeomanry.

It has been assumed that the places of the members of the Yeomanry who have joined the Imperial Yeomanry will be filled by recruiting. Provision has been made for this and for the training of the whole Yeomanry Force for a period not exceeding a month. Provision is also made for an increase in the contingent allowance, and in the allowances of officers under instruction.

Vote 5.—Volunteers.

The increase on this Vote is partly due to provision being made for the full capitation allowances, the Vote for 1899-1900 having been relieved of half the charges by means of a Supplementary Estimate in 1898-99. A large sum has been taken with the object of enabling the Volunteers to carry out an extended training in camp. Volunteer corps will be entitled to the ordinary efficiency grants in respect of the officers and men who have been withdrawn for service in South Africa. It is hoped that not only will their places be filled, but that advantage will be taken of the permission to recruit above the present regimental establishments. An addition has been made to the sum allotted for travelling allowance for attendance at shooting practice, to admit of a more extended use of the ranges. The provision which was made last year on a small scale to enable Volunteer corps to hire horses and wagons in order to practise transport duties in camp has been considerably extended, and a large addition has been made to the grants for the movement of guns of position. An additional amount is taken for an increase of Volunteer officers attending schools of instruction.

Vote 5.—Transport and Remounts.

Very large amounts are required for land and sea transport, a large proportion of the latter being to meet liabilities incurred during the present financial year. Arrangements have been made for the retention of a number of transports, partly in South African waters for the transfer of troops from one portion of the seat of war to another, and partly for the conveyance home of invalids and wounded, and for the despatch of reinforcements, and of drafts to make good the waste of troops in the field. It is also necessary to provide for the conveyance of further consignments of supplies, stores, and animals to South Africa. The item for land service provides not only for the conveyance of troops and stores by railway, but also for the hire of ox transport in the field. The Vote includes sums for the purchase of horses and mules to make good the waste occurring in the large number of animals in South Africa, and for the purchase of horses for the additions to the artillery and other arms of the Service. Money has also been taken under this vote for Regimental transport for the Militia and Yeomanry.

Vote 7.—Provisions, Forage, etc.

The increase on the Supply Vote, apart from the war and the special augmentation of the Army, would have been about £200,000, due to a rise in the cost of the bread and meat ration, and in the price of coal, and to increases of the Army authorised in former years. The maintenance of the Field Force in South Africa demands an expenditure of nearly £7,500,000. Field rations are provided not only for the troops, but for nearly 30,000 civilians employed as drivers of transport wagons, labourers, etc., and forage is supplied for some 80,000 horses and mules, as well as for draught oxen. The colonial allowance granted to officers serving in South Africa has been practically doubled. A four months

supply of food and forage is being maintained in South Africa as a reserve. The rate of separation allowance to the families of Reservists, embodied Militia, and others who are not in occupation of public quarters has been increased by about one-third. There is also provision under this Vote for the half wages paid to the families of men in Government employment before the war.

Nearly £2,200,000 is required to provide supplies and allowances for the Royal Reserve Battalions, the new units of artillery, and other increases to the Army, as well as for the embodied Militia.

Vote 8.—Clothing.

The increase on the Clothing Vote, apart from the special provision for the war and the increase to the Army, is due chiefly to a rise in the price of wool.

Nearly £2,800,000 is required for the war, a considerable portion of which is to meet liabilities for clothing the Field Force, incurred but which will probably not be brought into payment before the close of 1899-1900, and also for the necessary reserves of clothing to meet the issues to the troops in the field. Issues of clothing are also provided for the special increases to the Army and embodied for the Militia.

Vote 9.—Warlike Stores.

The increase on the Vote for Warlike Stores, apart from war charges and other special services, amounts to £719,000, provision being made for the equipment of the force to be permanently added to the Army. About £750,000 is also taken for the purchase of a number of semi-mobile guns of position. £4,750,000 is provided for services in connection with the war and the measures temporarily adopted to increase the force at home.

Provision is also made for the more rapid completion, already alluded to, of the programme for the re-armament of our fortresses.

Vote 10.—Works, etc.

The increase on Vote 10 is partly automatic, owing to the necessity of providing for a further annuity in repayment of sums borrowed under the Barrack Act of 1890. The building of barracks for a second infantry battalion, which it has been decided to station at Bermuda, will be begun. Additional accommodation will be provided for the Inspection Department at Woolwich Arsenal.

The increase in connection with the war amounts to £1,300,000. £500,000 is provided for huts required for the temporary accommodation of the troops to be added to the Army at home, and the same amount for hutting which has been ordered for the troops who may be retained in South Africa after the conclusion of active operations. A scheme is in preparation for providing the barracks necessary for the forces which will be permanently added to the Army. £300,000 is provided for Engineer services in the field, and hospitals, storehouses, etc., in South Africa, and also for the increased hospital accommodation which will be required in this country for the invalids and wounded.

Vote 13.—War Office.

The increase on the War Office Vote is almost entirely due to the war, and more than half is due to the charge for foreign telegrams; the remainder provides for additional temporary staff, and for the appointment of a Military Transport Officer, who is stationed at the Admiralty; it is proposed also to appoint a member of the Head Quarter Staff, who will be specially charged with business connected with the Auxiliary Forces.

Votes 14-16.—Non-Effective Services.

The increase in the Non-Effective Votes is mainly due to the war. There is an increase of about £100,000 in the provision for pensions and gratuities to wounded officers, and to widows and children of officers who lose their lives on service, but this is discounted to a large extent by the cessation of the retired pay and half-pay officers who are employed owing to the war, and the suspension of voluntary retirement. £50,000 additional is provided for Chelsea pensions for

the non-commissioned officers and men disabled by the war. Officers and men of all the colonial and local forces in Imperial pay, as well as civilians, surgeons, etc., are eligible for these pensions and gratuities.

February 27th, 1900.

LANSDOWNE.

ABSTRACTS OF ARMY ESTIMATES, 1900-1901.

Votes.		Net Estimates.		Increase on Net Estimates.
		1900-1901	1899-1900.† As per Ap- propriation Act, 62 & 63 Vict. c. 49.	
I.—Numbers.				
A	Number of Men on the Home and Colonial Establishments of the Army, exclusive of those serving in India	Total Numbers. 430,000	Total Numbers. 184,853 (Army Act, 1899, 62 Vict., c. 3)	Numbers. 245,147
II.—Effective Services.				
		£	£	£
1	Pay, etc., of Army (General Staff, Regiments, Reserve, and Departments)	15,200,000	6,509,000	8,691,000
2	Medical Establishments: Pay, etc.	555,000	305,800	249,200
3	Militia: Pay, Bounty, etc.	2,288,000	571,000	1,717,000
4	Yeomanry Cavalry: Pay and Allowances	144,000	75,000	69,000
5	Volunteer Corps: Pay and Allowances	1,230,000	624,200	605,800
6	Transport and Remounts	10,000,000	790,000	9,210,000
7	Provisions, Forage, and other Supplies	13,100,000	3,425,500	9,674,500
8	Clothing Establishments and Services	4,680,000	†1,086,800	3,593,200
9	Warlike and other Stores: Supply and Repair	8,000,000	2,531,000	5,469,000
10	Works, Buildings, and Repairs: Cost, including Staff for Engineer Services	2,670,700	1,211,900	1,458,800
11	Establishments for Military Education	113,800	111,100	2,700
12	Miscellaneous Effective Services	66,900	60,200	6,700
13	War Office: Salaries and Miscellaneous Charges	275,000	†251,500	23,500
	Total Effective Services ...	58,323,400	17,553,000	40,770,400
III.—Non-Effective Services.				
14	Non-Effective Charges for Officers, etc.	1,611,000	1,555,000	56,000
15	Non-Effective Charges for Men, etc.	1,379,000	1,325,500	53,500
16	Superannuation, Compensation, and Compassionate Allowances ...	186,000	183,700	2,300
	Total Non-Effective Services ...	3,176,000	3,064,200	111,800
	Total Effective and Non-Effective Services	61,499,400	20,617,200	40,882,200

† Exclusive of the Supplementary Estimate for War Services (£10,000,000) presented 17th October, 1899, and of the similar Supplementary Estimate (£13,000,000) presented 8th February, 1900, and of the additional men (35,000+120,000) included in those Estimates.

‡ £3,200 transferred from Vote 8 to Vote 13 in 1899-1900.

The annual return of the Yeomanry Cavalry Training for 1899 was recently issued as a Parliamentary paper. The total of all ranks present at last year's annual training was 8,804, of whom 550 were officers. The total enrolled strength of the Yeomanry Cavalry in Great Britain is 10,114, and the total establishment 11,891. Allowing for supernumeraries, there were 51 officers, 13 sergeants, 36 trumpeters, 26 corporals, and 1,651 privates wanting to complete establishment. The total number of horses returned is 8,969, of which 6,340 belonged to officers and men of the force, 1,208 to relatives or friends, and 1,421 were hired. Turning to the individual corps, the best return made is that by the Leicestershire Yeomanry Cavalry, which has an establishment of 431, and an enrolled strength of 403, of whom all but 17 were present at the annual inspection. This corps returns 386 horses, of which 315 belong to officers and men, 50 to their relatives and friends, and 21 were hired. The Royal Bucks Hussars have a slightly larger enrolled strength, but mustered six fewer at inspection.

Tactics may fairly be defined as the art of winning victories at the least cost of life. The victory must be won, but the greater the slaughter of the vanquished in proportion to the losses of the victor, the greater the art displayed.

Names of Battles.	Duration in Hours.	Percentage of Loss per Hour.					
Mollwitz ...	6	Austrians...	4	Prussians...	3·7	Field Actions.	Seven Years' War.
Chotusitz ...	4	"	5·6	"	4·3		
Hohenfriedberg..	5	"	4	"	1·5		
Kesselsdorf ...	2	Saxons ...	17	"	8·4		
Rossbach ...	1½	French ...	10·6	"	1·6		
Leuthen ...	4	Austrians...	7	"	4·8		
Zorndorf... ..	7	Russians ...	6·1	"	5·5	In these three Prussians assaulted entrenchments.	
Hochkirch ...	3	Austrians...	5	"	8		
Kunersdorf ...	6	Russians ...	4·4	"	7·2		
Torgau ...	5	Austrians...	5·8	"	6·4	Suvaroff in command.	Revolutionary Wars.
Jemappes ...	7	"	1	French ...	0·3		
Neerwinden ...	8	"	0·8	"	1·1		
Fleurus ...	15	"	0·3	"	0·5		
Trebbia ...	30	Allies ...	0·6	"	0·7	Napoleonic.	Breechloaders.
Austerlitz ...	4	Austrians...	3·2	"	2·6		
Jena ...	6	Prussians...	3·3	"	2·2		
Eylau ...	10	Russians ...	2·7	"	2·1		
Borodino ...	15	"	2·2	"	1·8		
Waterloo ...	8	Allies ...	2	"	4		
Königgrätz ...	11	Austrians...	1	Prussians...	0·3		
Wörth ...	8	French ...	2	"	1·5		
Vionville...	10	"	0·9	"	2·2		
Gravelotte ...	9	"	0·6	"	1·1		
Sedan ...	12	"	1·6	"	0·5		
Beaune la Ro-						Against Raw Troops.	
lande ...	8	"	0·6	"	0·25		
Orleans ...	20	"	0·16	"	0·9		
Belfort ...	36	"	0·1	"	0·16		
Plevna—						Magazine Rifles.	
1st battle ...	4	Turks ...	4·5	Russians ...	7		
2nd battle ...	10	"	1·9	"	2·2		
3rd battle ...	60	"	2	"	3		
Modder River ...	10	British ...	0·7	Boers, unknown.			
Magersfontein ...	10	"	0·7	"			
Colenso ...	6	"	1	"			

NOTE.—Where battles lasted more than one day, there is great difficulty in arriving at the hours of actual fighting. The above figures give a fair approximation.

The foregoing table shows the percentage of loss per hour in the most typical battles of the past 150 years, and is based on the best official figures available. Only the last three may be considered as approximations only, and maximum ones at that.

It will be seen that the nature of the weapon has had singularly little result on the whole; for, allowing for the different quality of the troops engaged, the intensity of the fighting as measured by the loss per hour has steadily diminished.

The ruling factors appear to be: war service training, the national characteristics of the troops engaged, and the manner in which troops were raised.

The Editor would be glad to receive the assistance of any officers interested in the question, to enable him to compile a more complete record, embracing the actions of British troops; also of battles of the American Civil War. The special points required are:—

Duration of action in hours.

Total force engaged, including reserves; total losses—killed, wounded, and missing.

Total force engaged for opposing force.

Exceptional losses in individual units—cavalry, artillery, or infantry.

Whether field actions, or attack or defence of earthworks.

The value of contemporary statistics has often been questioned. It may, therefore, be useful to point out that, though regimental officers may have had in the old days a strong motive to exaggerate them, as a rule the general officers had an equally strong reason to minimise them. Minute accuracy is not attainable, but figures such as the above show in the most marked way certain well-defined tendencies.

INDIA.—The Cavalry Brigade from Lucknow, consisting of 3 squadrons 3rd Hussars, and 4 of the 1st Bengal Lancers, recently took part in a nine days' reconnaissance. The general idea, undisclosed till the last moment, was to meet and attack a hostile force based in Nepal, represented by the Bengal Cavalry from Fyzabad, attempting to seize the Elgin Railway Bridge and the bridge of boats at Bahramghat. Colonel Gartside-Tipping, commanding the Cavalry Brigade, despatched one squadron of the 1st Bengal Lancers by forced march to Bahramghat, a distance of 42 miles. The squadron was unable to effect a lodgment on the far side of the Gogra, as a party of the enemy who had arrived by train had seized the eastern bank. Colonel Gartside-Tipping took possession of all sailing craft on the river, and two nights later out-manceuvred the commands of the enemy by ostentatiously preparing for a passage therein, and embarking about half-a-dozen combatants and all the grass-cutters. When the boats drew near the opposite bank they came under a heavy fire from the bulk of the enemy, who had been collected to oppose them at some distance from the bridges. The few troopers in the boats replied with a rapid fire, and the battle raged for three-quarters of an hour. One squadron of the 1st Bengal Lancers, meanwhile, creeping across the railway bridge with bare feet, supported by the 3rd Hussars, found the attention of the enemy's half squadron, left to hold the eastern end of the bridge, entirely occupied by the fight going on upstream, and before discovery the attacking force approached within a few yards of the great iron door, with which the abutment of the bridge is provided. An explosive charge was laid, the door burst open, and the Lucknow force charged home on the half squadron of the enemy. The bridge of boats was then taken in reverse, and two squadrons of the Lucknow garrison bivouacked on the eastern bank. After that the enemy did not act with any spirit in a combat, which was quite hopeless, and at the end of the week both forces returned by easy marches to their respective stations.—*Pioneer Mail*.

AUSTRIA-HUNGARY.—The Imperial Manœuvres this year will take place in Galicia, and will be "army manœuvres" carried out by several army corps.

Those taking part in them are the 1st Army Corps (Cracow), the 10th (Przemysl), and the 11th (Lemberg), as well as all the troops of the Galician Landwehr and several divisions and brigades of other army corps (Hungarian). The chief supervision is entrusted to Staff Lieut.-General von Berk. During the operations the Imperial Headquarter Staff will be established at Krosno. — *Le Progrès Militaire*.

A trial mobilisation of an artillery ammunition column was made on the 30th May last by the artillery regiment belonging to the 5th Army Corps quartered at Presbourg.

The ammunition column consisted of 36 wagons, viz. :—

32 battalion ammunition wagons with 4 horses each.

1 wagon with accessories with 4 horses.

1 baggage wagon with 4 horses.

2 ration wagons with 2 horses each.

The experiment consisted of two parts : the first, a march through a difficult country ; the second a march supposed to be executed in an enemy's country, in the midst of a hostile population where the column was liable to attack by infantry and cavalry patrols.

The first march included the ascent and descent of Mount Gensenberg, 1,427 feet high, with steep rugged sides, covered with bushy trees, and cut with narrow, badly kept roads. Advice had been given to halt the wagons at the head of the column at the top of the mountain in order to allow the column to close up before commencing the descent.

In the criticism that followed the operation, both the regimental and brigade commanders laid particular stress on the importance and the necessity of fixing in advance, in difficult country, the places where the column should close up, in order that the detachment commander might make himself acquainted with the incidents of the march.

The column was preceded at about 325 yards distance by an advance guard, the necessity for which was made the object of a critical discussion. The rôle of this advanced guard consisted in looking out for the best road to follow, to make it practicable, and to clear away obstacles which might delay the march of the column. It was composed of two mounted officers to reconnoitre the road, and a detachment of reserve gunners provided with pioneer's instruments. It had also a certain number of reserve horses, which were left at the most difficult places to assist the regulation teams.

In the ascent of the mountain all the horses, but in the descent only the leaders, were led.

From the commencement of the ascent the connection between the advanced guard and the main body was lost. It was exceedingly difficult to maintain in a country where the roads had so many windings and off-shoots. It resulted in many wagons becoming involved in impracticable roads, and one of them had its pole broken. The pole of another wagon was also smashed in consequence of the horse falling down. At several places, too, the teams had to be reinforced by the reserve horses of the advanced guard.

The second march was carried out in accordance with the following scheme :

"The column left to its own resources, that is to say, unprovided with a special escort, continues its march from Gensenberg to Blumenau. It should protect itself against possible attempts of the inhabitants of the country and against probable attacks of hostile infantry and cavalry patrols." A detachment of infantry and one of cavalry, each under command of an officer, was sent in advance by different roads with orders to attack the column at the most suitable spots on the road. The commander of the column made the following dispositions : 12 reserve gunners, under the orders of an officer, formed the advanced guard, which was preceded by two mounted men as the extreme point. 12 gunners were echeloned down the wagons, making 1 gunner to every 3 wagons ; 24 gunners were divided into 3

detachments of 8 men each, one detachment marching at the head of the column, another in the middle, and the third at the end of the column as a rear guard.

Half-way a hostile infantry patrol having been marked down on the outskirts of a farm about 450 yards to the right, the column was halted and the advanced guard, reinforced by the detachment at its head, was sent against the enemy, who immediately fell back. Shortly afterwards a hostile cavalry detachment made its appearance on the left of the column, at the same time that the infantry, that had just been repulsed, opened fire from the outskirts of a wood on the opposite side. The commander halted the column once more, placed the horses under cover, and sent against the cavalry the 12 gunners echeloned down the wagons, the detachment from the middle of the column, and the rear guard; against the infantry he despatched the advanced guard and the detachment from the head of the column. In the criticism the commander of the column was reproved for recommencing his march after the first attack without having pursued the enemy and without having thrown out a flank guard.—*Bulletin de la Presse et de la Bibliographie Militaires.*

GERMANY.—The orders and instructions relative to the execution of the grand manœuvres for this year have been recently published. These will, for the first time, be carried out in accordance with the instructions contained in the new Field Service Regulations. The Guards Corps and the 2nd Army Corps have been selected to take part in the Imperial manœuvres, operating one against the other. They will be each formed, for the time, into 3 infantry divisions. On this account a special brigade, formed from the 8th and 12th Grenadier Regiments of the 3rd Army Corps, will be attached to the 5th Brigade of Guards, which will give a 3rd Infantry Division to that corps, to which will be also attached, as divisional cavalry, a cavalry regiment made up from a squadron of Hussars of the Guard and from the 3rd Uhlans of the Guard, and as artillery it will also have attached a 3rd Guards Artillery Brigade, made up of the first and second groups from the Gunnery School for Field Artillery, and a regiment of Field Artillery from the 3rd Army Corps.

In the 2nd Army Corps the 3rd Division will be made up from the 71st Infantry Brigade, from the 5th Grenadier Regiment, and from the 128th Infantry Regiment, lent from the 17th Army Corps. The latter will furnish in addition a cavalry regiment, composed of a squadron of the 3rd and one of the 12th Dragoons, as well as a regiment of field artillery, so that this 3rd Division of the 2nd Army Corps will not have a complete artillery brigade.

It may be added that each of these two army corps that will manœuvre before the Emperor will have a balloon detachment, and that the Guards Corps will have its squadron of mounted Jägers, with which the 2nd Corps is not yet provided. It must be remembered as well that the Guards Corps has its cavalry division constituted in peace-time and composed of three brigades. A similar one will be formed for the 2nd Army Corps, which will be called "A" Division, and will include, in addition to the 3rd Cavalry Brigade of the 2nd Corps, two brigades, one formed by the 1st and 2nd Hussars, and the other by the 5th Hussars and the 17th Uhlans.

A cavalry division, called "B," will, in the same way, be formed from the 4th Corps, by the 7th Cavalry Brigade (which is part of that corps), from the 17th Brigade (17th and 18th Dragoons), and from the 20th Brigade (16th Dragoons and 17th Hussars). This division will not have a pioneer section.

These two cavalry divisions, A and B, will execute special cavalry manœuvres, as will also the Guards Cavalry Division, which will, for the time, be formed into 3 brigades of 2 regiments each, viz:—Gardes du Corps and Cuirassiers, 1st and 3rd Uhlans, and 1st and 2nd Dragoons, with a group of horse artillery and a pioneer section. The special manœuvres for each of these 3 divisions will take place on the manœuvre grounds, of Coburg, Hammerstein, and Munster.

The 4th and 16th Army Corps will be exercised in attacks on fortified positions, assisted by heavy field artillery, but without real fire. A third army corps, not yet decided upon, will have similar exercises, but with real fire.

Instructional cavalry rides will be executed in the 15th Army Corps.

Grand pioneer manoeuvres will take place on the Lower Vistula, on the Upper Rhine, at New-Brisach, and in the neighbourhood of Duren, Julies, and Cologne. The former will be bridging exercises and the latter attacks on positions.—*Le Progrès Militaire*.

The composition of the Bavarian Army consists, at present, of two army corps. The first is composed of the 1st and 2nd Divisions, and the second of the 3rd, 4th, and 5th Divisions. Each division consists of two brigades, with the exception of the 2nd and 5th, which have three each, making a total of twelve brigades. In compliance with the law for the re-organisation of the German military forces, of the 25th March, 1899, Bavaria will raise, on the 1st April next, a 3rd Army Corps, by taking the necessary infantry units from the existing army corps and forming a divisional staff. Each army corps will thus consist of two divisions of two brigades each. A third battalion of pioneers will also be raised for the 3rd Army Corps.

The headquarters of the 1st Army Corps (first and second divisions) will remain at Munich, those of the 2nd (fourth and fifth divisions) at Wurtemberg, those of the 3rd (third and sixth divisions) will be at Nuremberg. A cavalry brigade will continue to be attached to each of its former divisions. The newly formed sixth division will remain temporarily without cavalry; it will eventually get two squadrons.

The re-organisation of the field artillery, which consists at present of two brigades, or five regiments, will commence on the 1st October, 1900. There will be formed at the same time one brigade staff, three regimental staffs, one group staff, as well as six howitzer batteries. On the other hand, four batteries of horse artillery will be done away with.

On the 1st October, 1901, two brigade staffs, three regimental staffs, one group staff, as well as three field batteries will be raised.

Finally, on the 1st October, 1902, one brigade staff, one regimental staff, one group staff, and three field batteries will be raised.

From that date the field artillery will consist of:—6 brigades, 12 regiments, 24 field artillery and 1 horse artillery groups, viz., 60 batteries, of which six will be howitzer and two horse artillery. The regiments will have, on a peace footing, one group of three, and one of two batteries, the latter being increased to three batteries on mobilisation. A battalion staff and one company of military train will be formed on the 1st October next. Another military train company and a telegraph company will be organised on the 1st October, 1901.—*Bulletin de la Presse et de la Bibliographie Militaires*.

The Budget effectives of the Germany Army for 1900 are as follows:—

INFANTRY.

Prussia.—166 regiments, the Infantry Instruction Battalion at Potsdam, 7 schools for non-commissioned officers, and the Infantry School for Musketry.

Saxony.—16 regiments and 1 school for non-commissioned officers.

Wurtemberg.—10 regiments.

Bavaria.—24 regiments, 1 school for non-commissioned officers, and 1 school for musketry. These combined units make a total of 12,036 officers, 44,050 non-commissioned officers, 323,224 privates, 1,233 medical officers, 619 paymasters, and 621 armourers.

JÄGERS.

Prussia.—14 battalions.

Saxony.—2 battalions.

Bavaria.—2 battalions.

These battalions together make up a total of 1,434 non-commissioned officers, 9,840 privates, 36 medical officers, 18 paymasters, and 18 armourers.

RECRUITING OFFICES.

Prussia.—285.

Saxony.—19.

Wurtemberg.—17.

Bavaria.—32.

These recruiting offices consist of 870 officers, 3,024 non-commissioned officers, 2,733 privates, 13 medical officers, and 2 paymasters.

CAVALRY.

Prussia.—73 regiments and 1 school for cavalry instruction.

Saxony.—6 regiments and 1 riding school.

Wurtemberg.—4 regiments.

Bavaria.—10 regiments and 1 riding school.

These regiments and schools make a total of 2,406 officers, 9,410 non-commissioned officers, 56,819 privates, 213 medical officers, 96 paymasters, 322 veterinary-surgeons, 93 armourers, 93 saddlers, 65,135 horses.

FIELD ARTILLERY.

Prussia.—70 regiments and 1 school for gunnery.

Saxony.—6 regiments.

Wurtemberg.—4 regiments.

Bavaria.—8 regiments.

Total.—2,980 officers, 11,694 non-commissioned officers, 52,622 gunners, 292 medical officers, 195 paymasters, 280 veterinary-surgeons, 195 armourers, and 32,879 horses.

FOOT ARTILLERY.

Prussia.—14 regiments and 1 battalion, a school for gunnery, and 1 company at the disposal of the commission for artillery experiments.

Saxony.—1 regiment.

Bavaria.—2 regiments.

Making a total of 872 officers, 4,477 non-commissioned officers, 18,700 gunners, 59 medical officers, 38 paymasters, 37 armourers, and 43 horses.

PIONEERS.

Prussia.—19 battalions.

Saxony.—2 battalions.

Wurtemberg.—1 battalion.

Bavaria.—3 battalions.

Making a total of 571 officers, 2,310 non-commissioned officers, 12,504 privates, 49 medical officers, 25 paymasters, and 25 armourers.

TROOPS FOR COMMUNICATIONS—RAILWAY AND BALLOON.

Prussia.—3 railway regiments, 1 administrative railway brigade section and 1 balloon section.

Saxony.—2 railway companies and 1 detachment of administrative railway brigade section.

Bavaria.—1 railway battalion, and 1 balloon section.

Making a total of 192 officers, 754 non-commissioned officers, 3,973 privates, 5 medical officers, 12 paymasters, and 8 armourers.

TELEGRAPH TROOPS.

Prussia.—3 battalions.

Saxony.—1 company.

Wurtemberg.—1 detachment.

Altogether 45 officers, 145 non-commissioned officers, 1,202 privates, 6 medical officers, 3 paymasters, and 3 armourers.

MILITARY TRAIN.

Prussia.—17 battalions.

Saxony.—2 battalions.

Wurtemberg.—1 battalion.

Bavaria.—3 battalions.

Making a total of 322 officers, 1,750 non-commissioned officers, 6,213 privates, 30 medical officers, 23 paymasters, 23 veterinary-surgeons, and 4,872 horses.

There should be added, as belonging to special branches, such as companies of the Castle Guard, Military Schools, Cadet Schools, etc.; 544 officers, 1,341 non-commissioned officers, 3,274 privates, 36 medical officers, 12 paymasters, 18 veterinary-surgeons, and 1 armourer. The *personnel* not attached to corps consists of: 2,598 officers, 167 non-commissioned officers, 2 privates, 183 medical officers, 1 paymaster, and 38 veterinary-surgeons.

The total effective of the German Army in 1900, therefore, amounts to 23,844 officers, 80,556 non-commissioned officers, 491,136 privates, 2,165 medical officers, 1,044 paymasters, 671 veterinary-surgeons, 1,001 armourers, 93 saddlers, and 102,929 horses.

The total general effective amounts to 600,510.—*Revue du Cercle Militaire*.

RUSSIA.—Grand manœuvres will take place this year, in the presence of the Emperor, towards the end of the month of August, in the country between the towns of Koursk and Orel. They will present a special interest, both on account of the numbers of troops taking part in them, and on account of the two chiefs nominated to command the opposing forces. The manœuvres will be under the general direction of the Grand Duke Michel Nicolaevitch, Director-General of Artillery, who will also act as chief umpire.

The troops will be divided into two armies:—First, that of Moscow, under the command of the Grand Duke Serge Alexandrovitch, Governor-General and Commandant of the Moscow District; second, that of the South, commanded by Lieut.-General Kouroupatkine, the Minister for War.

The Moscow Army will consist of:—The 13th Army Corps (Smolensk), under Lieut.-General Rebinder, and the 17th Army Corps (Toula), under Lieut.-General Bilderling; the 1st Cavalry Division (Moscow), under General Prince Vassiltchikof; the 2nd and 3rd Reserve Brigades of Artillery, the 13th and 17th Engineer Battalions, and the 2nd Battalion Cadre of the Military Train, which will be lent by the Vilna District. The whole will make a total of 75 battalions, 36 squadrons or sotnias, and 168 guns.

The Southern Army will be formed from troops taken from the military districts of Kief and Odessa, and will consist of:—The 10th Army Corps (Kharkoff), under General Vinberg, and a composite army corps composed of the 15th Infantry Division (Odessa), under General Philippof; the 34th Infantry Division (Ekaterinoslov), under General Plioutsinsky; and the 4th Brigade of Chasseurs (Odessa), under General Khondiakof; the 2nd mixed Division of Cossacks (Kamenets Podolsk), under General Domantovitch—the regiments of this brigade will only consist of four squadrons or sotnias, and will have no artillery—the 4th Reserve Brigade of Artillery, the 7th and 14th Engineer Battalions, and the 4th Battalion Cadre of the Military Train. These will make up a total of 79 battalions, 40 squadrons or sotnias, a Cossack brigade, and 180 guns.

The cavalry attached to the two armies will be divided into corps and divisional cavalry. The distribution will be different in each of the opposing sides

in order that the experience of the manœuvres may establish the proper proportion to be observed between these two. Hitherto, before this year, in the grand manœuvres, one side was given an offensive and the other a purely defensive rôle. The scheme formed for the manœuvres of 1900 will give to both adversaries opportunities for offensive and defensive operations. It is with this object that the composition of the Southern Army will at first be numerically inferior, in order that it might fight when retreating; afterwards, having received reinforcements from the south, it might assume the offensive.

The general idea of the manœuvres is as follows :—

A main Western Army has crossed the Dnieper between Orcha and Rietchiytza, in the Moghileff and Minsk districts respectively, and advances on Moscow. Its right flank is protected by the Southern Army which advances from Koursk towards Orel in order to seize that town and the Orel-Briansk railway line. The former learns that superior forces are marching from Orel on Koursk, and orders the Southern Army to endeavour to retain possession of the latter place, which is an important railway junction; the first phase will take place before the arrival of reinforcements.

On the other hand, a main Eastern Army endeavours to divert the enemy who has crossed the Dnieper between Orcha and Rietchiytza, and retreats on Moscow. As it wishes to arrest the enemy on the Smolensk-Briansk line, it orders the Moscow Army to drive back the enemy advancing from Koursk.

The period of the manœuvres is fixed for eight days, of which two will be set apart for rest for the troops, and one to a grand review before the Emperor. The troops will be amply provided with technical material, such as telegraphs, telephones, and balloons. Experiments on a large scale will be made with cyclists, the transmission of information by wireless telegraphy and of carrier pigeons.

Mounted infantry will play an important part in these manœuvres on both sides, and will be taken from the 1st Division for the Moscow and from the 10th Division for the Southern Army.

Provisioning will be carried out partly by field railways and partly by motor wagons. The troops will have the use of "Norton Wells," which should certainly prove satisfactory, as water is near the surface in the manœuvre district—*La France Militaire*.

SPAIN.—By Royal Order, the effective strength of the Army is fixed as under from the 1st February next :—

Infantry	...	...	...	...	...	...	...	...	45,986
Cavalry	...	...	...	...	...	...	...	...	12,388
Artillery	...	...	...	...	...	...	...	...	12,834
Engineers	...	...	...	...	...	...	...	...	4,277
Administrative Troops	...	...	...	...	...	...	...	...	1,460
Special Services	...	...	...	...	...	...	...	...	2,501
Instruction Establishments	...	...	...	...	...	...	...	...	554
Total	...	...	...	...	...	...	...	...	80,000

From the tables accompanying the Royal Order, the following appear to be the strengths of the chief active units :—

INFANTRY.

From 542 to 579 men in home regiments.

From 840 to 982 men in regiments in Africa, the Balearic Islands, and the Canaries.

319 men in Chasseur battalions at home and in mountain infantry battalions.

856 men in Chasseur battalions in the Canaries.

CAVALRY.

From 384 to 404 men in home regiments.

From 120 to 150 men in the squadrons at Majorca and Melilla.

40 men in the troop at the Canaries.

ARTILLERY.

406 men in regiments provided with the 9-centimetre *matériel*.
 374 men in regiments provided with the 8-centimetre *matériel*.
 491 men in the light artillery regiment.
 403 men in the siege artillery regiment.
 681 men in each of the three mountain artillery regiments.
 From 455 to 529 men in regiments of position artillery.
 53 men in each of the 4 companies of artificers.

ENGINEERS.

From 551 to 569 men in the sapper and miner regiments.
 400 men in the pontoon regiment.
 620 men in the telegraph battalion.
 400 men in the railway battalion.
 60 men in the ballooning company.
 110 men in the company of artificers.
 80 to 88 men in the sappers and miners companies in Africa, the Balearic Islands, and the Canaries.

MILITARY ADMINISTRATION.

824 men in the 1st Administrative Brigade.
 491 men in the 2nd Administrative Brigade.
 881 men in the army medical corps.
 386 men in the brigade of artificers and staff topographical department.
 —*Revue du Cercle Militaire.*

SWITZERLAND.—The year 1899 will be remarkable for the appearance of machine guns at the German manoeuvres, at the Swiss Military Schools of Instruction, and, above all, in the war at present being waged in South Africa.

The tactical employment and the fire tactics of the machine-gun companies have been embodied in the form of regulations by the Swiss Military Department, of which the following are the most important extracts:—

“The object of attaching these machine guns, either to independent cavalry acting in advance, or to cavalry acting in conjunction with the three arms, is to increase the resisting power of cavalry, especially in our sort of country, as well as to stimulate the spirit of enterprise of its commander.

“Offering but a small target to the enemy, these guns may easily find cover from the formation of the ground and be completely masked, so that it would be difficult, if not impossible, for an enemy surprised by their fire to discover from whence it came.

“These units should not, in any case, impede the movement of cavalry, and are merely means to increase the chances of success in action. Cavalry allowed to consider itself merely as a support to these machine guns would at once lose its *raison d'être*.

“Machine guns attached to a brigade will form a company of eight pieces. This unit may either be used to act together, or else be distributed to squadrons or sections detached on special services. Too much breaking up of the unit is, however, to be deprecated, and in no case should one gun alone be detached.

“The commander of the company will be placed under the immediate orders of the cavalry commander. The latter having informed him of the general idea, will point out where positions are to be taken up and the objects to be attained.

“A machine-gun commander, who for some reason or other has received no instructions, will act on his own initiative.

“The machine-gun column will follow the cavalry, from which position they may either be thrust into the intervals or moved quickly to a flank, if necessary.

“Cavalry ordered to occupy an advanced position or a defile may detach a machine-gun section with a weak cavalry escort with orders to push on and hold

the given point until the arrival of the main body. This position may even be guarded by machine guns whilst the main body of the cavalry are employed in a more extended operation.

"In occupying a position the guns should be placed in such a manner as to command the points which would appear, from the configuration of the ground, to be favourable for the deployment of the enemy's forces. Special efforts should be made to keep the direction of the enemy's attack under fire of the machine guns. These considerations demand from the officer in command of the machine guns a very highly developed tactical eye and a perfect knowledge of the qualities of his arm, more especially as a position of this nature cannot usually be reconnoitred, still less fortified, beforehand.

"Cavalry charged with covering a very extended front, such as a river line or hills, may guard the chief passages with some machine guns, covered by a certain number of troopers, whilst the main body of the cavalry remains with the commanding officer, and may be launched at a propitious moment against that point that the enemy is trying to pierce. They may also be used at advanced posts of independent cavalry to guard the chief lines of the enemy's approach, as well as defiles.

"Opportunities will frequently occur to combine cavalry shock action with machine-gun fire, to lay traps for the enemy, to surprise him and draw him under fire. The rôle of machine guns in actions of cavalry against cavalry will necessarily be more limited. But then, too, they may render important services by hurling projectiles at the enemy, and thus prepare the attack; or by stopping the rush of the opposing cavalry. They would also be invaluable to cover a retreat, and to allow their cavalry to rally if its action has been unsuccessful.

"Maxims will, however, find their greatest field for activity in a fight where cavalry acts in conjunction with large bodies of troops in country not very suitable to cavalry tactics.

"In each phase of the fight, from the moment of stopping the hostile advanced guard, to that of protecting our own troops coming into action against the enemy's assaults, and, finally, to the moment of decisive action, machine guns will not lack objectives, on the destruction of which will probably depend the safety of the whole force.

"Finally, machine guns facilitate and favour the pursuit, which falls almost exclusively on the cavalry. They may also cover a retreat, if, thanks to their mobility, they can open fire on the enemy's flank."

The *Revue Militaire Suisse* gives the results of a machine-gun course which took place last autumn at Berne.

"The maximum rapidity of machine-gun fire is 600 shots a minute, which means 10 shots a second. This rapidity was, however, never attained during the course. To economise ammunition, the guns were regulated in such a manner as to fire a far smaller number of cartridges. The greatest rapidity of fire was attained by a single machine gun firing on balloons. This machine gun fired 248 shots in 55 seconds, or from four to five shots a second. At this rate the ammunition would become quickly exhausted, and the effects of a regulated fire would be terrible. The precision of the fire greatly surpasses that of a section of infantry, the hits on the targets amounting to 80 per cent.

"The objects to be fired at at short distances for field firing were small blue balloons about the size of a child's head. This sort of target has the great advantage of being extremely portable. An officer can carry an entire company of an enemy in his pocket. The balloons are blown out on the spot, and attached by strings to hedges, or stones, etc. The firing is made interesting by the bursting of these balloons, and no effect of imagination is required on the part of the firer for the distribution of the fire."—*Précis from Le Progrès Militaire*,

NAVAL AND MILITARY CALENDAR.

FEBRUARY, 1900.

1st (Th.)	1st Bn. Berkshire Regiment Detachment 3rd Bn. Royal Fusiliers Southern and Eastern Divisions R.A.	} Arrived at Gibraltar from England in the "Cephalonia."
" "	Ceylon Contingent (130) left Columbo for South Africa in the "Umkuzi."	
" "	4th Bn. Royal Lancaster Regiment (Militia) 9th Bn. King's Royal Rifles (Militia) Detachment No. 20 Company R.A.M.C. (Field Hospital)	} Arrived at Cape Town from England in the "Nile."
" "	A Battery New South Wales Artillery arrived at Cape Town from Sydney in the "Warrigal."	
2nd (F.)	A British Flying Mounted Column marched to the North of Zululand.	
" "	H.R.H. the Prince of Wales inspected a second Contingent of Imperial Yeomanry, consisting of 1 Company Herts and 1 Company Loyal Suffolk Hussars, and a Battery Hon. Artillery Company, in Regent's Park.	
" "	No. 13 Company Shropshire Yeomanry No. 14 and 15 Companies Northumber- land Yeomanry Hospital Staff Veterinary Staff Base Dépôt Staff	} Left England for South Africa in the "Mont- eagle."
3rd (Sat.)	1st Bn. South Staffordshire Regiment left Gibraltar for England in the "Cephalonia."	
" "	2nd Bn. North Staffordshire Regiment 14th Division Field Hospital	} Arrived at Cape Town from England in the "Aurania."
" "	Draft R.A. 2nd Norfolk Regiment 2nd Bn. Lincoln Regiment 1st Bn. Royal Irish Regiment 2nd Bn. Gloucester Regiment 1st Bn. East Lancashire Regiment 2nd Bn. Hampshire Regiment 2nd Bn. North Stafford Regiment Detachment No. 7 General Hospital	} Left Ireland for South Africa in the "Dictator."
" "	R.G.A. No. 14 Company, S. Division R.G.A. No. 17 Company, W. Division	} Left England for South Africa in the "German."
" "	Battery Hon. Artillery Company No. 4 Company Oxfordshire Yeomanry Irish Hospital	} Left England for South Africa in the "Montfort."
4th (S.)	The City of London Imperial Volunteers (258 officers and men) arrived at Cape Town from England in the "Garth Castle."	
" "	Ammunition Column 7th Division Detachment 4th Division Field Hospital	} Arrived at Cape Town from England in the "Glengyl."
5th (M.)	General Sir Redvers Buller resumed his advance for the relief of Ladysmith, again crossed the Tugela and captured several Boer positions after hard fighting.	

5th (M.)	No. 3 Hospital Train (Princess Christian's) Detachment No. 6 General Hospital Staff Imperial Yeomanry City of London Imperial Volunteers (105)	Arrived at Cape Town from England in the "Kinfaun's Castle."
" "	1st Bn. East Lancashire Regiment 2nd Bn. South Wales Borderers 4th Division Field Hospital	
" "	R.G.A. No. 10 Company, Eastern Division R.G.A. Nos. 2, 6, and 10 Companies, Western Division Draft 2nd Bn. East Kent Regiment " 2nd Bn. Bedford Regiment " 2nd Bn. Cheshire Regiment " 1st Bn. West Riding Regiment " 1st Bn. Oxford L.I. " 2nd Bn. Royal Irish Rifles " 1st Bn. Munster Fusiliers Post Office Corps Detachment No. 6 General Hospital	Arrived at Cape Town from England in the "Bavarian." Left England for South Africa in the "Canada."
6th (T.)	Boers attempted to recover positions captured by Sir Redvers Buller, but were repulsed.	
7th (W.)	H.M.S. "Europa" arrived at Portsmouth from Malta with relieved crew of the "Ramillies."	
" "	H.M.S. "Beagle" arrived at Plymouth from S.E. Coast of America.	
" "	Lord Roberts and Lord Kitchener left Cape Town for the front,	
" "	Lieut.-General Sir W. Gatacre was attacked by the Boers and repulsed them.	
" "	Major-General Macdonald occupied Koodoosberg, near Spytfontein, thus threatening Boer right flank.	
" "	The War Office ordered the formation of six new Horse and Field Artillery batteries.	
" "	Draft 6th Dragoons Mounted Infantry 6th Division, Com- pany 1st Bn. West Riding Regiment Mounted Infantry 6th Division, Com- pany 1st Bn. Oxford L.I. Remounts Cavalry and Royal Artillery	Arrived at Cape Town from England in the "Pindari."
" "	No. 7 Company Leicestershire Yeomanry No. 28 Company Bedfordshire Yeomanry No. 29 Company Denbigh Yeomanry Hospital Staff Veterinary Staff Remounts	
" "	No. 16 Company Worcestershire Yeomanry Remounts	Left England for South Africa in the "Kent."
" "	2nd Bn. Leicestershire Regiment left England for Egypt in the "Dunera."	
8th (Th.)	H.M.S. "Latona" paid off at Portsmouth.	
" "	1st Bn. South Staffordshire Regiment arrived in England from Gibraltar in the "Cephalonia."	

- 8th (Th.) 4th Cavalry Brigade Staff
7th Dragoon Guards
No. 3 Company A.S.C.
No. 20 Company R.A.M.C. (B.C.)
Draft 2nd Bn. Northampton Regiment } Left England for South Africa in the "American."
- 9th (F.) General Sir Redvers Buller again retired south of the Tugela.
Total British casualties during operations amounted to 380.
- " " Supplementary Estimates issued for an additional number of men and money required for the operations in South Africa, £13,000,000 and 120,000 men being asked for.
- " " H.R.H. the Prince of Wales inspected a third contingent of Imperial Yeomanry, consisting of 35th Company Middlesex and 36th Company East Kent Yeomanry, in Regent's Park.
- " " Detachment Royal Engineers
Draft 1st Life Guards
Draft 2nd Life Guards
Draft Royal Horse Guards
Draft 6th Dragoon Guards
Remounts
Detachment No. 7 General Hospital
Field Hospital (American Section) } Left England for South Africa in the "Narrung."
- 10th (Sat.) H.M.S. sloops "Shearwater" and "Vestal" floated out at Sheerness.
- " " 3rd Bn. Northumberland Fusiliers (Militia) left England for Malta in the "Pavonia."
- " " Remounts (Yeomanry, 1,001 horses) left England for South Africa in the "Mount Royal."
- " " No. 37 Company Bucks Yeomanry
No. 38 Company Bucks Yeomanry
No. 39 Company Berks Yeomanry
Yeomanry Hospital
10th Bn. Staff } Left England for South Africa in the "Norman."
- " " 6th Bn. Lancashire Fusiliers (Militia)
Draft 2nd Bn. West Yorkshire Regiment
Draft 2nd Bn. Yorkshire Light Infantry
Draft 1st Bn. Suffolk Regiment
1st Bn. Argyll and Sutherland Highlanders
Detachment No. 8 General Hospital } Left England for South Africa in the "Malta."
- 11th (S.) Colonel Plumer made an unsuccessful attack on the Boer position at Crocodile Pools Bridge.
- " " Colonel Hannay with a brigade of mounted infantry marched from Orange River to Ramden, south of Jacobsdal.
- " " Brigade Division Staff R.F.A. 7th Division
83rd, 84th, and 85th Batts. R.F.A.
Detachment 5th Division Field Hospital } Arrived at Cape Town from England in the "Manchester Port."
- " " Volunteer Company Royal Warwick Regiment
Volunteer Company Norfolk Regiment
Volunteer Company Suffolk Regiment
Volunteer Company Royal Welsh Fusiliers
Volunteer Company East Lancashire Regiment
Volunteer Company Hampshire Regiment } Left England for South Africa in the "Dune Castle."

- 11th (S.) No. 23 Company Duke of Lancaster's
Yeomanry
No. 24 Company Westmoreland and
Cumberland Yeomanry
Hospital Staff
Veterinary Staff } Left England for South
Africa in the "Afric."
- 12th (M.) Military proposals of Government announced, by which 30,000 men
are to be added to the Army and 50,000 to the Auxiliary Forces.
17 new Line battalions, 5 regiments of cavalry (1 formed from
troops of Yeomanry), 36 batteries of Field and 7 of Horse
Artillery to be raised.
- " " General French with Cavalry Division crossed the Riet River, followed
by the 6th and 7th Infantry Division.
- " " No. 2 Company S.D., R.G.A.
No. 5 Company E.D., R.G.A.
3rd Bn. South Lancashire Regiment
(Militia)
4th Bn. Argyll and Sutherland High-
landers (Militia)
Detachment No. 5 Company R.A.M.C.
(Bearer Company) } Arrived at Cape Town from
England in the "City of
Rome."
- " " 13th Brigade Division R.F.A.
2nd and 44th Batts. R.F.A.
Ammunition Column
Draft R.E.
Detachment 1st Bn. King's Own Scottish
Borderers
Detachment No. 5 Stationary Hospital } Arrived at Cape Town from
England in the "St.
Andrew."
- " " City of London Imperial Volunteers (218) arrived at Cape Town from
England in the "Gaul."
- " " 4th Bn. South Staffordshire Regiment
(Militia)
Detachment 4th Bn. Lancaster Regi-
ment (Militia)
Detachment 6th Bn. Royal Warwick
Regiment (Militia)
Detachment South Lancashire Regi-
ment (Militia)
Detachment 4th Bn. Derbyshire Regi-
ment (Militia)
Detachment 9th Bn. King's Royal Rifle
Corps (Militia)
Detachment 3rd Bn. Durham L.I.
(Militia)
Detachment 4th Bn. Argyll and Suther-
land Highlanders (Militia)
Draft 2nd Bn. Royal Fusiliers
" 2nd Bn. Royal Scots Fusiliers
" 1st Bn. Royal Welsh Fusiliers
" 2nd Bn. Somerset L.I.
" Detachment No. 8 General
Hospital } Left England for South
Africa in the "Arundel
Castle."

12th (M.)	3rd Bn. Welsh Regiment (Militia)	} Left England for South Africa in the "Majestic."
	3rd Bn. Royal Lancaster Regiment (Militia)	
	Draft 3rd Bn. Grenadier Guards	
	Draft 1st Bn. Coldstream Guards	
	Draft 2nd Bn. Coldstream Guards	
	Draft 1st Bn. Scots Guards	
	Draft 1st Bn. Highland L.I.	
	Detachment No. 7 General Hospital	
	Yeomanry Hospital	
13th (T.)	H.M.S. "Amphion" paid off at Devonport.	
" "	General French with Cavalry Division seized Klip Drift on the Modder River and captured five Boer laagers.	
" "	British outposts round Rensburg driven in by the Boers.	
" "	8th Hussars	} Left Ireland for South Africa in the "Norseman."
	Detachment 7th Dragoon Guards	
	Draft 5th Dragoon Guards	
	" 2nd Dragoons	
	" 5th Lancers	
	" 14th Hussars	
	" 18th Hussars	
	" 2nd Bn. Duke of Cornwall's L.I.	
	Detachment No. 20 Field Hospital	
14th (W.)	320 Reserve Horses	} Arrived at Durban from India in the "Upada."
	One Transport Section	
	Twelve 15-pounder and six 4.7 naval guns	
" "	14th Brigade Division R.F.A. (Staff)	} Arrived at Cape Town from England in the "Ulstermore."
	39th and 88th Batts. R.F.A.	
	Ammunition Column	
	Detachment No. 6 General Hospital	
" "	3rd Bn. South Wales Borderers (Militia)	} Left Ireland for South Africa in the "Cheshire."
	Draft 16th Lancers	
	" 2nd Bn. Royal Highlanders	
	" 1st Bn. Connaught Rangers	
	Detachment No. 8 General Hospital	
" "	3rd Bn. Seaforth Highlanders (Militia)	} Left England for Egypt in the "Simla."
	Draft 2nd Bn. Seaforth Highlanders	
	Reservists 1st Bn. Cameron Highlanders	
	Detachment No. 7 General Hospital	
" "	17th Lancers	} Left England for South Africa in the "Victorian."
	Draft 2nd Bn. Lancashire Fusiliers	
	Detachment No. 8 General Hospital	
" "	Volunteer Company Devonshire Regiment	} Left England for South Africa in the "Greek."
	Volunteer Company Bedfordshire Regiment	
	Volunteer Company South Wales Borderers	
	Volunteer Company King's Own Scottish Borderers	
	Volunteer Company Welsh Regiment	
	Volunteer Company Northamptonshire Regiment	
	Volunteer Company Manchester Regiment	

- 15th (Th.) General French, with Cavalry Division, relieved Kimberley, which had been besieged since 14th October, 1899.
- " " City of London Imperial Volunteers (467) arrived at Cape Town from England in the "Ariosto."
- 16th (F.) H.M.S. "Diana" commissioned at Chatham for Relief Duty to Australia.
- " " H.M.S. "Nympe" paid off at Portsmouth.
- " " Volunteer Company Royal Scots
 Volunteer Company East Kent Regiment
 Volunteer Company Royal Irish Regiment
 Volunteer Company Royal Scots Fusiliers
 Volunteer Company Cheshire Regiment
 Volunteer Company Scottish Rifles
 Volunteer Company Royal Highlanders
 Volunteer Company Wiltshire Regiment
 Volunteer Company Highland Light Infantry
 Volunteer Company Argyll and Sutherland Highlanders
 " " 3rd Bn. East Lancashire Regiment (Militia)
 5th Bn. Royal Dublin Fusiliers (Militia)
 Draft 2nd Bn. Seaforth Highlanders
 No. 7 General Hospital
 No. 3 Remount Depot
 " " Mounted Infantry Company 2nd Bn. West Riding Regiment
 2nd Bn. Essex Regiment
 2nd Bn. Durham Light Infantry
 " " General French cleared the Boers from Olifontsfontein and Alexandersfontein, south of Kimberley, and seized their laager, containing stores and ammunition.
 " " Magersfontein position abandoned by the Boers.
 " " Jacobsdal occupied by Lord Roberts.
- 17th (Sat.) 6th Division under General Kelly-Kenny captured 78 wagons belonging to Cronje's retreating army.
- " " General Sir Redvers Buller commenced another advance to the relief of Ladysmith.
- " " Dordrecht evacuated by the Boers after successful attack on their laager by Brabant's Horse.
- " " A third New Zealand Contingent (261 officers and men and 280 horses) left Wellington for South Africa on the "Knight Templar."
- " " 13th Yeomanry Brigade Staff
 No. 47 Company Duke of Cambridge's Own Yeomanry
 " " Detachment 17th Lancers
 "M" Batt. R.H.A.
 Ambulance Column 4th Cavalry Brigade
 Draft 6th Dragoons
 Cavalry Remounts
 Detachment No. 8 General Hospital
- Left England for South Africa in the "Gascon."
- Left Ireland for South Africa in the "Servia."
- Arrived at Cape Town from India in the "Palamcottah."
- Left England for South Africa in the "Dunorgan Castle."
- Left Ireland for South Africa in the "Pinemore."

- 17th (F.) 1 Squadron 8th Hussars
 Mounted Infantry 4th Cavalry Brigade
 (Mixed Company)
 Mounted Infantry 4th Cavalry Brigade
 (Machine Gun Section)
 Draft 1st Dragoons
 Draft 19th Hussars
 No. 20 Field Hospital
 " " Volunteer Company Lincoln Regiment
 Volunteer Company Leicestershire
 Regiment
 Volunteer Company Yorkshire Regiment
 Volunteer Company Gloucestershire
 Regiment
 Volunteer Company West Riding Regi-
 ment
 Volunteer Company York and Lancaster
 Regiment
 Volunteer Company Gordon Highlanders
 Left England for South
 Africa in the "Sicilian."
- 18th (S.) Sir Redvers Buller seized Monte Cristo and turned the enemy's
 flank on the south bank of the Tugela. The Boers were
 driven across the river, their camps, ammunition, and stores
 being captured.
- " " 13th Brigade Division R.F.A. (Staff)
 8th Batt. R.F.A.
 Detachment Ammunition Column
 14th Brigade Division R.F.A.
 68th Batt. R.F.A.
 Draft 1st Bn. Liverpool Regiment
 " 1st Bn. Leicestershire Regiment
 " 2nd Bn. Yorkshire L.I.
 " 2nd Bn. Wiltshire Regiment
 Remounts
 No. 6 General Hospital
 A.P.C.
 Arrived at Cape Town from
 England in the "American."
- " " A portion of the 2nd Canadian Contingent (2 batteries) arrived at
 Cape Town from Halifax in the "Laurentian."
- " " 2nd Bn. Highland L.I. left Colombo for England in the "Jelunga."
- " " Ceylon Contingent (130) arrived at Cape Town from Colombo in the
 "Umkuzi."
- " " 2nd Bn. Leicestershire Regiment arrived at Alexandria from England
 in the "Dunera."
- 19th (M.) Colenso re-occupied by the British.
- " " Cronje and his force surrounded by the British at Paardeberg, about
 30 miles from Jacobsdal.
- " " 3rd Bn. Northumberland Fusiliers (Militia) arrived at Malta from
 England in the "Pavonia."
- " " A portion of New South Wales Contingent arrived at Cape Town
 from Sydney in the "Southern Cross."
- " " Detachment R.E.
 Draft 1st Life Guards
 " 2nd Life Guards
 " Royal Horse Guards
 " 6th Dragoon Guards
 Remounts
 Detachment No. 7. General Hospital
 Field Hospital (American Section)
 Arrived at Cape Town from
 England in the "Narrung."

- 19th (M.) City of London Imperial Volunteers (138) arrived at Cape Town from England in the "Pembroke Castle."
- " " 4th Bn. West Yorkshire Regiment (Militia) } Left England for South Africa in "Austral."
- " " 4th Bn. Middlesex Regiment (Militia) }
- " " Detachment No. 5A General Hospital }
- 20th (T.) H.M.S. "Edgar" commissioned at Portsmouth for Relief Duty to China.
- " " H.M.S. "Hussar" arrived at Plymouth from Mediterranean.
- " " Lord Roberts bombarded Cronje's forces at Paardeberg with fifty guns and defeated reinforcements coming to his assistance. Cronje asked for an armistice, which was refused, unconditional surrender being demanded. Boers lost over 800 during bombardment.
- " " Lord Roberts issued a proclamation promising protection to Free Staters who would return peaceably to their farms, and declaring all goods required for British troops would be paid for.
- " " 1st Bn. Royal Sussex Regiment } Left Malta for South Africa in the "Pavonia."
- " " Mounted Infantry Contingent }
- " " Detachment R.A.M.C. }
- " " Detachment No. 7 General Hospital }
- " " No. 9 Company Yorkshire Hussars (Yeomanry) }
- " " No. 10 Company Sherwood Rangers (Yeomanry) }
- " " No. 11 Company Yorkshire Dragoons (Yeomanry) }
- " " No. 12 Company South Notts Yeomanry } Arrived at Cape Town from England in the "Winifredian."
- " " 3rd Bn. Staff }
- " " Hospital Staff }
- " " Veterinary Staff }
- " " 4th Bn. Staff }
- " " 5th Bn. Staff }
- " " 8th Bn. Staff }
- " " Machine Gun Section }
- " " A second New Zealand Contingent (262 officers and men and 300 horses) arrived at Cape Town from Wellington in the "Waiwera."
- " " 3rd Bn. Royal West Surrey Regiment (Militia) }
- " " 4th Bn. Scottish Rifles (Militia) } Left England for South Africa in the "Cephallonia."
- " " Draft R.E. (Telegraphs) }
- " " 2nd Bn. Royal West Surrey Regiment }
- " " 2nd Bn. Scottish Rifles }
- " " No. 8 General Hospital }
- 21st (W.) 2nd Bn. Royal West Kent Regiment left Egypt for England in the "Dunera."
- " " A portion second Canadian Contingent left Canada for South Africa in the "Milwaukie."
- " " 12th Brigade Staff R.F.A. (Howitzer) } Arrived at Cape Town from England in the "Canning."
- " " 87th Batt. R.F.A. }
- " " Remounts }
- " " No. 5 Stationary Hospital }
- " " Details }

21st (W.)	No. 6 Company Staffordshire Yeomanry No. 8 Company Derbyshire Yeomanry Hospital Staff Veterinary Staff	Arrived at Cape Town from England in the "Cavour."
" "	12th Brigade Division R.F.A.(Howitzer) Ammunition Column Draft 13th Hussars " 1st Bn. Border Regiment " 1st Bn. Loyal North Lancashire Regiment Remounts Detachment No. 6 General Hospital	
23rd (F.)	No. 41 Company Hampshire Yeomanry No. 43 Company Suffolk Hussars (Yeomanry) Hospital Staff Veterinary Staff	Arrived at Cape Town from England in the "Goth."
" "	No. 17 Company Ayr and Lanark Yeomanry No. 18 Company Lanark Yeomanry No. 19 Company Lothian and Berwick Yeomanry 5th Bn. Machine Gun Section 6th Bn. Staff Hospital Staff Veterinary Staff Machine Gun Section	
" "	3rd Bn. Royal Munster Fusiliers (Militia) Draft 2nd Bn. Royal Lancaster Regiment " 2nd Bn. Middlesex Regiment Detachment No. 5A General Hospital	Left Scotland for South Africa in the "Carthaginian."
" "	The Queensland Contingent arrived at King."	
" "	Volunteer Company 1st Bn. Northumberland Fusiliers Volunteer Company 2nd Bn. Northumberland Fusiliers Volunteer Company Liverpool Regiment Volunteer Company West Yorkshire Regiment Volunteer Company Worcestershire Regiment Volunteer Company South Lancashire Regiment Volunteer Company Derbyshire Regiment Volunteer Company Yorkshire L.I. Volunteer Company Durham L.I.	Left England for South Africa in the "Avondale Castle."
24th (Sat.)	The Boers delivered a severe assault on Mafeking, but were repulsed with heavy loss.	
" "	15th Brigade Division R.F.A. Staff 5th, 9th, and 17th Batts. R.F.A. Ammunition Column Detachment No. 6 General Hospital	Arrived at Cape Town from England in the "Manhattan."

24th (Sat.)	12th Brigade Division R.F.A. (Howitzer) Staff	Arrived at Cape Town from England in the "Englishman."
	43rd and 86th Batts. R.F.A.	
	Draft 2nd Bn. Northampton Regiment	
	Detachment No 5 Stationary Hospital	
" "	Portion of New South Wales Contingent arrived at Cape Town from Sydney in the "Surrey."	
" "	R.G.A. No. 10 Company "E" Division	Arrived at Cape Town from England in the "Canada."
	R.G.A. Nos. 2, 6, and 10 Companies, Western Division	
	Draft 2nd Bn. East Kent Regiment	
	" 2nd Bn. Bedford Regiment	
	" 2nd Bn. Cheshire Regiment	
	" 1st Bn. West Riding Regiment	
	" 1st Bn. Oxford L.I.	
	" 2nd Bn. Royal Irish Rifles	
	" 1st Bn. Munster Fusiliers	
	Post Office Corps	
	Detachment No. 6 General Hospital	
" "	Volunteer Company Loyal North Lancashire Regiment	Left England for South Africa in the "Mexican."
	Volunteer Company Seaforth Highlanders	
	Volunteer Company Gordon Highlanders	
	12th Brigade Staff	
25th (S.)	Cronje refused Lord Roberts's offer for a safe conduct for women and children shut up with him in his laager at Paardeberg. He also rejected the loan of doctors and ambulance.	
" "	3rd Bn. Norfolk Regiment (Militia)	Left Ireland for South Africa in the "Orotava."
	4th Bn. Cheshire Regiment (Militia)	
	Draft Derbyshire Regiment	
	No. 24 Field Hospital	
	No. 5A General Hospital	
" "	No. 5 Company Warwickshire Yeomanry	Arrived at Cape Town from England in the "Lake Erie."
	No. 21 Company Cheshire Yeomanry	
	No. 22 Company Cheshire Yeomanry	
	No. 32 Company Lancashire Hussars (Yeomanry)	
	2nd Brigade Staff	
	Hospital Staff	
	Veterinary Staff	
	No. 7 Company Leicestershire Yeomanry	
	No. 23 Company Lancashire Hussars (Yeomanry)	
	No. 24 Company Westmoreland and Cumberland Yeomanry	
	Machine Gun Section	
26th (M.)	No. 13 Company Shropshire Yeomanry	Arrived at Cape Town from England in the "Monteagle."
	No. 14 and 15 Companies Northumberland Yeomanry	
	Hospital Staff	
	Veterinary Staff	
	Base Hospital Staff	
" "	R.G.A. No. 14 Company, S. Division	Arrived at Cape Town from England in the "German."
	" No. 17 Company, W. Division	

- 26th (M.) Lumsden's Horse left India for South Africa in the "Lindula."
- 27th (T.) Cronje, with 4,300 Boers, surrendered to Lord Roberts at Paaderberg.
- " " Sir Redvers Buller, with British troops, carried by assault the Boers' main position at Pieters on the Tugela.
- " " Rensberg re-occupied by the British under General Clements.
- " " Draft Royal Artillery
- " " 2nd Bn. Norfolk Regiment
- " " 2nd Bn. Lincolnshire Regiment
- " " 1st Bn. Royal Irish Regiment
- " " 2nd Bn. Gloucestershire Regiment
- " " 1st Bn. East Lancashire Regiment
- " " 2nd Bn. Hampshire Regiment
- " " 2nd Bn. North Staffordshire Regiment
- Detachment No. 7 General Hospital
- " " Battery Honourable Artillery Company
- " " No. 4 Company Oxfordshire Yeomanry
- " " Irish Hospital
- " " 4th Bn. Bedford Regiment (Militia)
- " " 3rd Bn. West Riding Regiment (Militia)
- " " Draft Royal Engineers
- " " Nos. 1, 2, 3, 4, 5, 6, and 7 Remount Depôts
- " " Detachment No. 5A General Hospital
- 28th (W.) Lord Dundonald with Cavalry entered and relieved Ladysmith, which had been besieged since the 17th October, 1899.
- " " H.M. the Queen inspected a company of the Royal Berkshire Volunteers (116) at Windsor prior to their embarkation for South Africa.
- " " Draft 12th Lancers
- " " R.H.A.
- " " Detachment No. 5A General Hospital
- " " Remounts
- " " Details
- " " Nos. 1 and 2 Companies Wiltshire Yeomanry
- " " No. 3 Company Gloucestershire Yeomanry
- " " No. 4 Company Glamorgan Yeomanry
- " " 1st Bn. Staff
- " " Hospital Staff
- " " Machine Gun Section
- " " No. 33 Company East Kent Yeomanry
- " " Nos. 34 and 35 Companies Middlesex Yeomanry
- " " No. 36 Company West Kent Yeomanry
- " " No. 20 Company Fife Light Horse, Yeomanry
- " " 11th Bn. Staff
- " " Hospital Staff
- " " Veterinary Staff
- " " Machine Gun Section

Arrived at Cape Town from England in the "Dictator."

Arrived at Cape Town from England in the "Montfort."

Left Ireland for South Africa in the "Goorkha."

Left England for South Africa in the "Ottoman."

Left England for South Africa in the "Cymric."

28th (W.) Nos. 37 and 38 Companies Bucks	}	Arrived at Cape Town from England in the "Norman."
Yeomanry		
No. 39 Company Berks Yeomanry		
Yeomanry Hospital		
10th Bn. Staff		
Medical Staff	}	Left England for South Africa in the "Assaye."
Veterinary Staff		
Base Dépôt Staff		
" " 3rd Bn. Yorkshire Regiment (Militia)		
Draft 1st Bn. Royal Scots		
" Devonshire Regiment		
" 1st Bn. Inniskilling Fusiliers		
" 1st York and Lancaster Regiment		
" Durham L.I.		
" Royal Irish Fusiliers		
" Gordon Highlanders		
Base Dépôt Staff		
Remount Dépôt No. 2		
" Princess Christian's " Hospital		
Draft A.O.C.		
A.P.D. and Details		

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NOTICES OF BOOKS.

Geist und Stoff in Modernen Krieg. By C. VON B. K. Wien: Wilhelm Braumüller. 1896.

This very remarkable work deserves more than passing attention, on three grounds :—

1. It comes to us from Berlin with the reputation of being, in the opinion of one of the few men fully qualified to criticise it, as "almost the only original contribution to the theory of war since Clausewitz wrote."

2. Its author is an Austrian staff officer of only thirteen years' service, who has had access to documentary evidence accumulated in the Austrian archives of the very greatest historical value, and hitherto unpublished.

3. The whole line of thought and the conditions of nations, communications, and the like possess special interest for us, in view of the many points of contact with the past, both in our military and civil institutions, and the curious resemblance that may be traced between the Austrian campaigns in the Netherlands from 1792-6 and events now in progress in South Africa.

The author's main purpose is to show that everywhere and in all times the art of war has been conditioned by causes entirely beyond the control of the generals, and in so far as one general proved superior to another, the ultimate secret of his success lay, not so much in superior intellect, as in greater energy and will-power on the part of the victor. If to the critics of the nineteenth century, accustomed to all the appliances and resources invention has placed at our disposal, much in the conduct of the wars of the eighteenth century appears quite irreconcilable with our present theories; this was due to no want of perspicuity on the part of our forefathers, from whom indeed we have still much to learn, but simply and solely to causes of friction within society itself with which only the exceptional man could wrestle satisfactorily; and the proof of this he might have adduced from modern British experience, for in proportion as our operations take place in more or less civilised parts, we are compelled to rely more and more on bases and convoys and other primitive methods, until the execution of our campaigns comes to bear a striking resemblance to the pre-Frederician style of operations.

In his introductory chapters the author calls attention to the difference in the ulterior causes of hostilities in the old days and in the present. His point of view is striking, and, as to the best of our knowledge it is original, we give it at some length.

In the eighteenth century, though the avowed cause of war was often slight, even trivial, the ultimate aims were generally very high and far-reaching; in the latter half of the nineteenth century almost the exact opposite holds good. In the eighteenth century it is as if we had strong resolute boards of directors unscrupulously fighting for the success of their firms and quite indifferent to the complaints of the minor shareholders. Nowadays we see chairmen and directors of relatively weak concerns hampered in their policy by meetings of shareholders, and led often to their destruction by an ill-informed and sometimes corrupt Press. National feeling thoroughly roused is beyond the control of even the strongest ruler, and all a foreign ministry can do is to direct the stream to the best attainable advantage. These are points of view which escaped the notice of the peace apostles last autumn, but are points destined to have a far wider influence on the future than any mere question of armaments or explosives.

At the close of the seventeenth century, years of incessant warfare had reduced the frontier districts of the principal Powers almost to deserts—roads were almost non-existent, cultivation had well-nigh ceased, and it had as a consequence become impossible to make war support war in the old manner. Fighting also as a trade had developed into a highly specialised profession. Disciplined troops could hold their own against any levies that the conditions of the ground rendered it possible to bring against them. Patriotism in frontier districts had never existed—and since if war was to be made at all, cultivation had to exist, it became the settled policy of all the Powers to spare the country as much as possible, to find good markets for produce, and to prevent exactions. And this tendency was much strengthened by the readiness with which the cultivators changed their allegiance—which was practically open to the side which bid highest in promises of good treatment.

From these causes combined there arose the system of bases and convoys, with all their harassing impedimenta to rapid movement which they necessarily entailed, and which, had they persisted, not even the genius of Napoleon could have overcome. But the causes themselves provided their own undoing, for, thanks to the security thus provided, the riches of the districts increased enormously, and the figures he quotes from Austrian official returns reveal, in the periods of rest, a power of recuperation which is simply astonishing.

Having outlined these special conditions, he then proceeds to analyse in detail a typical campaign of Prince Eugene's "Carpi and Chiari, 1701"—with observations on the subsequent conduct of operations down to the death of that great commander, and the picture he presents is very remarkable.

Armies everywhere so uniform in recruitment, arms, methods, and supply; battles so bloody and uncertain in their issue, that only exceptional circumstances could justify the risk (for the trained soldier took both time and money to replace), that war became a game of stratagems, and victory was "sneaked" rather than conquered. Troops lay for months behind almost impregnable entrenchments, studded with a luxury of obstacles of which we have nowadays no conception, and with a natural strength of profile for which the latest practice affords us no parallel. Feints, false rumours, bribery, and corruption, all were resorted to, to induce a weakening of the garrison at some special point; and then at last everything was staked on a night assault to carry the works at any cost; but these attacks were made over short distances, where every stick and stone was known to the assailants, and by troops whose professional honour demanded a punishment of at least 30 per cent. to justify retreat—and they frequently obtained it and to spare.

The first breach in the continuity of this revolution was the appearance of the Prussian infantry on the field of Mollwitz. Iron ramrods and a rate of five or six steady volleys a minute formed a new factor, far more destructive of existing theories than any subsequent change from muzzle to breech-loader. The author absolutely traverses Frederic's claim to great generalship in the early part of his career, showing that his opponents were quite a match for him in the strategic field, and traces all his successes, first to his matchless infantry, then to his superb cavalry, and finally, when the Austrians had adopted a system of entrenchments and use of the ground, which in a great measure neutralised these advantages, to the undoubted resolution of his character and his dual position both as King and generalissimo, which allowed him to squander his troops with a recklessness no subordinate commander responsible to a Sovereign and his Ministers could ever hope to rival.

He does not defend the Austrian employment of entrenchments, but explains the conditions which alone rendered their employment possible. If Frederic had been fighting against a fair numerical equality, his more rapid movements due to higher discipline would never have allowed time for their construction; but, as there were two enemies in the field, whilst he struck at one, the other had abundant

time to construct a veritable fortress. And when it came to a direct assault on these elaborately prepared positions, it was not only the crossing and converging fire of infantry which had to be faced, but lines of batteries of heavy guns 18- to 24-pounders posted 18 feet from centre to centre, and delivering a storm of case—double-shotted generally—such as no modern mobile gun can hope to equal. There were no lyddite or shrapnel shell in those days, under cover of which the assailant could advance more safely than under the screen of night. Regiments often left 50 per cent. of their men in front of these lines, and nowadays we speak of "terrific slaughter" where not 10 per cent. have fallen and carried their objective. The men who fell in these desperate efforts could not be replaced in time enough, and ultimately Prussia was forced to agree to terms by sheer weight of numbers; but even then the terms were good, and it was practically a case of mutual surrender due to sheer exhaustion.

During the succeeding years of peace until the beginning of the revolutionary wars, the countries rapidly recovered from their losses, even more rapidly than after the close of the wars of the Spanish succession. Roads were laid out, bridges built, and the theatre of probable strife on and about the Rhine became again a kind of national granary.

The Prussian Army became the model for all Europe, and about seven years after the peace of Hubertus Burg reached its very zenith. Every nation vied with the others in copying its drill regulation, dress, and equipment, and had fresh war broken out, in the absence of any commanding genius, tactics would have been at the same deadlock over again.

The French, however, never could adapt themselves to Prussian methods, though they carefully copied the drill-books; the men simply would not stand the drill necessary to deliver the six volleys a minute of the Prussians, and until those six volleys had done their work it was felt that the bayonet charge of a three-deep line had no prospect of success. Hence sprang up a school who favoured the small columns, covered by the fire of a few picked skirmishers, a recurrence to the old *verlorene haufe*, hence "forlorn hope," of the seventeenth century, and these tendencies were strongly reinforced by the return of Lafayette and others, who in America and Canada had learnt what real skirmishing meant. All this, however, was still in the air, and when the French revolutionary levies first faced the Allies at Valmy, they met them nominally on the same old Prussian drill-book, "line" and "line" only.

Then there happened what has happened since, notably in 1870. The "line" had not fire power enough to prepare its own advance, and necessarily, of course, no cohesion to advance without preparation. The human element, temporarily held in subjection by discipline, re-asserted itself, and the troops sorted themselves out in layers of specific courage. The bravest hung on to the enemy, backed and handled by the few who knew what skirmishing meant, the less brave closed together in clumps of various density, and as fresh troops were remorselessly flung into the fire by leaders who knew that for them it was victory or the guillotine, so after many and many a trial a form of action was devised which by numbers and attrition was bound to break down the resistance of the line.

The line took some beating however, for as a rule the proportion of losses was from five to seven French for one Austrian or Prussian, and as a specific incident we may quote a case in the battle of Pirmasens which our author quotes from a recent issue of the "*Kriegsgeschichtliche Einzelheiten*," and which is believed to be thoroughly authentic:—

"On the right flank of the position there lay a small wood, with a frontage of 2,750 paces. Into this wood 150 riflemen were sent, who were supported by a Grenadier battalion and 4 guns placed outside the wood. The French attacked in column and were beaten off. The Prussians lost 168 killed and wounded, and the French lost 2,014—of whom 800 were buried where they fell."

The new system, however, would and must have failed, but for causes altogether apart from the battle-field. The Austrians being for the most part in

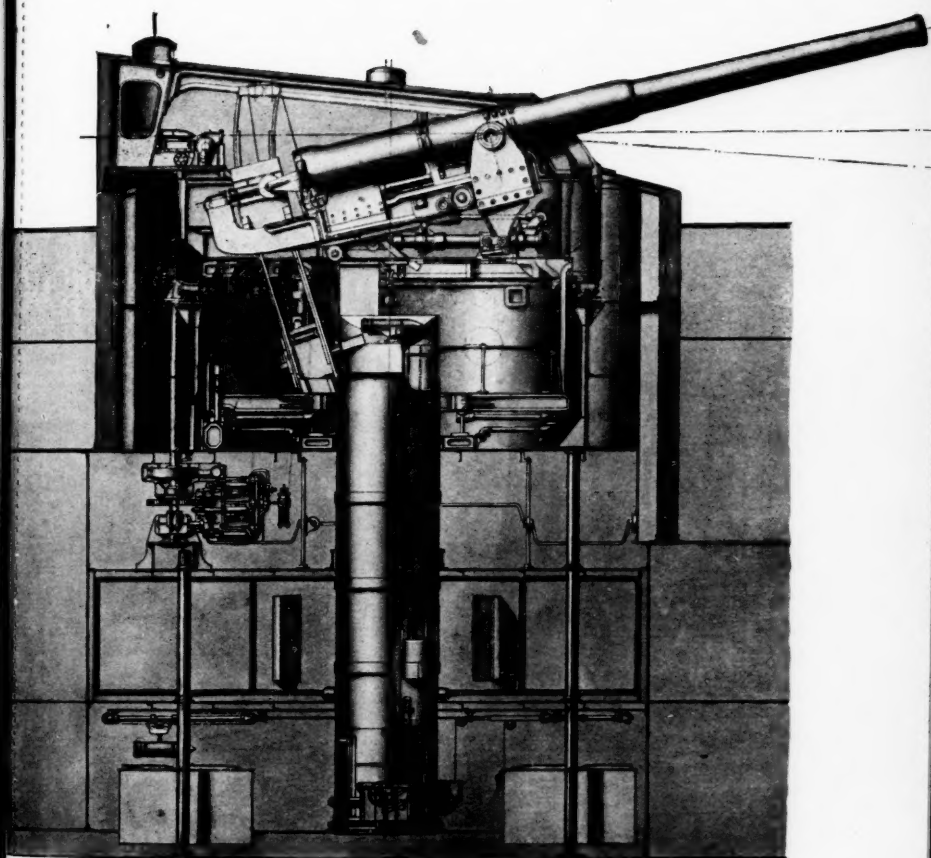
their own or an ally's country could not afford to live on the country, which, thanks to the causes above indicated, had so completely recovered its fertility that it amply sufficed for the French needs. Moreover, the draconic measures of the convention gave the latter an inexhaustible supply of men almost within the area of operations itself. The Austrians, on the other hand, were separated by 800 miles from Vienna, and 800 miles in those days meant more than the 7,000 from England to the Boer frontier to-day. The Austrians, therefore, could not, and dared not, risk their men in the lavish manner of their opponents.

To meet the ever-growing numbers of the French they had recourse to a multiplicity of small columns, covering a wide extent of front; but this only multiplied the number of vulnerable flanks, and staked the result of a "battle" not on one great issue, but on many small ones, and though for a long time the balance of advantage rested with the Austrians, the balance was small, the drain on their resources great, and by degrees the whole of the Netherlands had to be abandoned.

But this gave the stamp to all the subsequent fighting until Napoleon appeared on the scene. All through Moreau's campaign on the Rhine and in Bavaria there is the same tendency—hopeless over-extension on both sides (25,000 men on either, fighting on a front of 25 miles, Stokach and Osterach, for example)—and no decisive victory on either. Still the relative mobility in both being practically identical, there was no entrenching to speak of, and as the length of the lines of communication increased for the French, and diminished for the Austrians, the two armies had nearly arrived at an equilibrium, when the really brilliant strategic ability of the Archduke turned the scale decidedly in the Austrian favour. By better scouting and abler staff management he picked up his detachments scattered between the Main and Danube, and hurling them together on the French left wing, compelled the latter to give way, and ultimately to withdraw altogether from the theatre of operations.

Still the conduct of operations was dull, it seemed that the power to risk much on a single issue had been lost, for as yet even Napoleon had not begun to play for the maximum stakes in battle, though, as his treaty of Leoben showed, he was already a master at bluffing on an empty hand. His turn was yet to come in Europe, and meanwhile it was Suvaroff who first showed what sheer energy and determination of character could accomplish. He broke the French in Lombardy by dogged hard fighting and taught the Austrians the priceless lesson that 10,000 men spent in bringing about a decisive issue to a single battle was better than 50,000 wasted in indecisive fighting and marching; but that lesson they never really took to heart; again and again in the years that followed, notably at Wagram, a little of Suvaroff's hardness of heart would have changed the face of Europe—but that little was wanting, as it always has been in armies of slow recuperating strength under leaders responsible to a higher secular power; it would seem to be an indispensable condition for the evolution of the highest fighting power of a nation that the offices of generalissimo and Emperor should be combined in one and the same hands.

The work, unfortunately, is still unfinished; a second volume is promised us, but it is already three years overdue. The interest this one has inspired in us, the innumerable lines of suggestive thought which it has opened up, especially in connection with recent events, and which the reader may be left to evolve for his own edification, are so great that no apology need be made for introducing this work to his notice even in its present unfinished condition.



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